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Local Clusters in a Globalized World

A Foucauldian analysis of the people in an MNC subsidiary located in a cluster

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Publication date:
2011

Document Version
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Reinau, K. H. (2011). *Local Clusters in a Globalized World: A Foucauldian analysis of the people in an MNC subsidiary located in a cluster*. Department of Development and Planning, Aalborg University.

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Local Clusters in a Globalized World

**A Foucauldian analysis of the people in an
MNC subsidiary located in a cluster**

**Ph.D. thesis by
Kristian Hegner Reinau
Aalborg University**

Aalborg University
Department of Planning
Geography

This PhD dissertation is handed in for assessment to the
Faculty of Engineering and Science, Aalborg University

Title: Local Clusters in a Globalized World, A Foucauldian
analysis of the people in an MNC subsidiary located in a cluster

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Project period: 1st of August 2006 to 31st of July 2011

PhD supervisor: Associate professor Søren Kerndrup.

Copies: 30

ISBN: ISBN 978-87-91830-49-5

Preface

The 1st of August 2006 I became employed as Ph.D. student and Fixed-term Lecturer at Aalborg University, where I joined the geography research group at the Department of Planning. This thesis is the result of the five years of research and teaching that followed. I could not have written this thesis without help, and therefore I will like to take this opportunity to say thank you to a number of special people.

First of all I would like to thank associate professor Søren Kerndrup for his help during my studies. It was him who taught me economic geography and introduced me to the cluster literature while I was a student in my 4th term of the bachelor education in Geography at Aalborg University in 2004. It was also him who supervised me back then when I wrote a project about clusters, and when I did my bachelor project on clusters as well as when I did my master thesis on clusters. He has always been extremely helpful and commented elaborately, constructively and patiently on my work. He has always been there when I needed help, day and night, during weekends as well as holidays. In critical situations, when my case companies closed or I when felt helplessly stuck in the theory, I could always turn to Søren, and he was always there to help and guide me on the right track. We have had many interesting discussions about theory, method and empiric data through all the years, and these have given rise to many important reflections and insights. I would literally, and this goes for not only this PhD thesis but for my whole education, not be where I am today if it had not been for Søren. So therefore a big and unique thank you goes to Søren.

A thank you also goes to the now late associate professor and head of the Business Department at AAU Bent Dalum. I first met Bent Dalum in 2004, when I interviewed him about the NorCOM cluster for a project. When I did my master thesis on clusters I started talking more to Bent, and he came up with some brilliant ideas about what would be good topics for my master thesis and after that for my Ph.D. Bent Dalum was a networking person. He knew everyone in the economic research circles working on clusters and regional development as well as in the NorCOM cluster. When I started my Ph.D. he took me under his wing and introduced me to his network. He made sure I became a member of the research group "Innovation, Knowledge and Economic dynamics" at Department of Business Studies at AAU, where he was located, as well as of the Danish Research Unit for Industrial Dynamics (DRUID). He wrote papers with me and introduced me to his scientific network at a number of courses and conferences, and in relation to the NorCOM cluster he dragged me along to a number of meetings, events and birthday receptions, and thus introduced me to his network in the cluster. Thereby I managed to build a network and this has opened a lot of doors for me since. I come from a non-academic background and when I started my Ph.D. I had no idea about how the academic world works. Bent taught me this, from introducing me to key people here and there, down to simple things such as; to that event you should wear a suit. Unfortunately Bent died far too early in the beginning of 2010. One thing Bent often talked about was that we should write a book to tell the story of the NorCOM cluster. As he never got to write this book, I hope that by writing this thesis and telling the story of the NorCOM cluster I can in a way fulfill one of Bent's dreams. He never saw the final case study in this book, but from the countless hours spent discussion the cluster and rumors about companies and key people in these with him, I am fairly sure, that although he thought Foucault's theories were some strange French nonsense, he would have appreciated an account of the cluster which tells the detailed story of the discussions and struggles around the cluster, for that was Bent's interest.

A thank you also goes to professor Bent Flyvbjerg. Bent was my personal mentor in the final years of my master education and during my PhD until 2009, where he left Aalborg University for a position at University of Oxford. His advice in relation to my career, choice of Ph.D. and approach to the academic world has been priceless to me, and is definitely also part of the reason why I am where I am today. It was also Bent who opened my eyes to Foucault's writings, and who gave me advice about how to act in the academic world, which has meant everything to me. Therefore, I also owe Bent a huge thank you.

A thank you also goes to all the people who were part of Texas Instruments Denmark A/S, Motorola Denmark A/S and the NorCOM cluster who have helped. Without your help, I would not have been able to write this thesis. A special thank you in this regard goes to Jens Christian Lindof, Kim Breum-Christensen and Bernd Sheffler, former TIDK, and Flemming Eriksen, former Motorola Denmark A/S.

A thank you also goes all my good friends and colleagues at Aalborg University for their help. The people in the Geography research group at Department of Planning, for the discussions of differences between the local and the global, regional development and critical geography. The people in the Urban Planning and Mobility (UPM) group, also at Department of Planning, for interesting discussions of research methods and Foucault. The people in the Power discussion group, also at Department of Planning, for the interesting discussions of different perspectives on power. The people in the Innovation Knowledge and Economic dynamics (IKE) research group at Department of Business Studies, for the discussions of evolutionary economics, knowledge and cluster dynamics. People in the Centre for Mobility and Urban Studies (C-MUS) as well as the people at Department of Architecture, Design & Media Technology.

A thank you also goes to the people at the Department of Innovation and Organizational Economics at Copenhagen Business School who I visited for 5 months during my work on this thesis, especially professor Peter Maskell and associate professor Mark Lorenzen. A thank you also goes to professor Philip Cooke from Cardiff University, who I also visited during the work on my thesis, and who has also commented on my research throughout the years.

A thank you also goes to the people in the Danish research Unit for Industrial Dynamics (DRUID) for many interesting conferences.

A special thank you also goes to my family, my mother Eva Hegner Reinau, my father Leif Reinau, my grandfather John Hegner Reinau, my brother Andreas Hegner Reinau and not least my girlfriend Stine Britt Laursen. My family means everything to me, and they have encouraged me in my research and always been there to supported me, as well as have had to put up with my complaining about the Ph.D. thesis; whether it would be good enough, finish on time etc. etc. Andreas has helped me make the cover of the thesis. Stine has patiently helped me proof reading the thesis and helped translate Danish quotes in the story of NorCOM. A thank you also goes to Hans Moestrup and Mette Moestrup for their help and advice during my work on the thesis.

Finally, a thank you also goes to my friends Karsten Kryger Hansen and Jacob Skødt Jensen. It was a great help to get away from the thesis now and then, on photo trips, and forget everything about research.

Errors are my responsibility alone.

Kristian Hegner Reinau
Aalborg July 2011

Danish summary

Denne afhandling handler om, hvordan medarbejdere i et datterselskab af en multinational virksomhed lokaliseret i en klynge konstrueres som de subjekter de er i forhold til deres arbejde, i spændingsfeltet mellem den lokale klynge og det multinationale selskab. Forskningsspørgsmål lyder derfor:

"Hvordan blev personerne i TIDK konstrueret som subjekter, og hvordan blev NorCOM klyngen som de var en del af konstrueret"

For at besvare dette spørgsmål udvikledes en analytisk tilgang på baggrund af Michel Foucaults ideer om genealogi og arkæologi, præsenteret i blandt andet (Foucault 1972; Foucault 1984a; Foucault 1998). Arkæologien har tidligere været anset som en blindgyde i den sekundære litteratur om Foucaults værker, men på linje med nyere sekundær litteratur argumenteres der for, at arkæologien er et vigtigt bidrag, og som noget nyt argumenteres der for at genealogien i analytisk arbejde må placeres før arkæologien.

Anvendelsen af Foucaults metoder betyder også, at den tilgang til videnskab der findes i den eksisterende klyngelitteratur forkastes til fordel for den phronetiske tilgang til videnskab udviklet af Bent Flyvbjerg (Flyvbjerg 2001). Dette betyder bl.a., at fokus placeres på udviklingen af specifik kontekstuel viden frem for universelle teorier, og derfor er forskningsspørgsmålet også et specifikt kontekstuel spørgsmål.

Fremgangsmåden i analysen var dermed således, at analysen bestod af tre dele. I den første del blev TIDK analyseret og i anden del NorCOM klyngen. Fremgangsmåden i begge disse skridt var at der først blev foretaget en genealogisk inspirerede analyse. I TIDK analysen var dette af de begivenheder, der havde påvirket organisationen TIDK og dens medarbejdere igennem tiden. I NorCOM casen af de begivenheder, der havde påvirket NorCOM klyngen igennem tiden. Derefter fulgte i begge analyser en mere arkæologisk inspireret fase hvor de diskurser og praksisser, der omgav de identificerede begivenheder, var i fokus. Endelig som tredje skridt blev der foretaget en arkæologisk analyse af de diskurser og praksisser, der var identificeret i henholdsvis analysen af TIDK og analysen af NorCOM klyngen, og resultatet var en identifikation af de diskursive formationer og problematiseringer hvor igennem medarbejderne i TIDK var konstrueret som subjekter og NorCOM klyngen som en klynge.

Med udgangspunkt i den udviklede analysetilgang analyseres det dermed i detaljer i denne afhandling, hvordan personerne i TIDK igennem en række praksisser og diskurser var konstrueret som de subjekter de var i forhold til deres arbejde, og hvilken rolle NorCOM klyngen, der også var konstrueret igennem en række diskurser og praksisser havde i denne henseende.

Afhandlingens bidrag er dermed for det første, at den udvikler en ny analytisk tilgang til klynge studier. Denne analytiske tilgang, der placerer fokus på diskurser og praksisser og behandler såvel klyngen, som organisationerne og medarbejderne i denne, som sociale konstruktioner har bl.a. den fordel, at den ophæver den skelnen der hidtil har været mellem dynamikken indeni klynger og udenfor klynger. Analysen viser således hvordan medarbejderne i NorCOM klyngen blev konstrueret i spændingsfeltet mellem diskurser og praksisser, der opstod indenfor og udenfor klyngen, og hvilken betydning disse havde i konstruktionsprocessen. Den analytiske tilgang bevirker også, at den konstruktionsproces der analyseres ikke bedømmes som værende god eller dårlig, en succes eller en fiasko. Derimod belyses i detaljer alle de begivenheder, kampe, misforståelser og tilfældigheder, der igennem historien medførte at medarbejderne i TIDK blev

konstrueret som netop de subjekter de var, samt at NorCOM klyngen opstod som netop den klynge den var. Afhandlingens andet bidrag er dermed denne detaljerede analyse, der kan danne grundlag for refleksion hos såvel de personer der var en del af historien som blandt læsere der er interesseret i klynger, om hvorvidt ting burde være gjort anderledes undervej eller ej. Således giver den også en værdifuld indsigt i de processer der kan forme klynger, som klyngeforskere kan bruge i deres refleksioner over vores nuværende teorier om klynger og disse teories brugbarhed.

Kristian Hegner Reinau

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Part I: When Clusters and MNCs meet

Chapter 1: Introduction

It is a Wednesday afternoon in May 2007. We are in a Texas Instruments Denmark A/S (TIDK), at Sofiendalsvej in Aalborg, Denmark. A group of seven base-band engineers are gathered for a meeting to discuss the current and future work on the eCosto project. Most are wearing short sleeved shirts or t-shirts because of the weather. You would maybe expect these engineers to bring piles of laptops to the meeting, but actually all except one have brought paper notebooks. As one explains, it is relaxing having a paper book, because it means no worries about power supply, battery life etc.

The eCosto has been running for around two years within Texas Instruments (TI) at this moment, and this is just one of many meetings in relation to the project. The goal of the project is to develop the Costo chip, which is going to be used in mobile phones. The purpose of the meeting is to assign tasks for the next couple of months as well as follow up on the progress of the project.

The group is entering the “pre-silicon tests” phase, in which the engineers have to validate the boards for the eCosto chip, to make sure that the boards are working perfectly when the new eCosto chips arrives at TIDK from TI’s wafer factories. When this happens, the chips have to be mounted on the boards, calibrated, tested and sent to other TI sites. Here other engineers are going to perform further tests on the chips, and software engineers are going to use the boards as platforms for software development.

After these pre-silicon tests have been discussed, the agenda moves on to the next phases. These are going to be the “Base-band wake-up” phase which is going to take place in TIDK, and the “RF wake-up” phase which are going to take place at a TI’s headquarter in Dallas, USA. These phases run simultaneously, and here the boards, with the eCosto chip mounted, are switched on for the first time, and the chips are woken up. This sounds trivial, but this is not the case, as it takes several thousand kilobytes of software just to wake the chip up. Work relations to TI Dallas are important for the engineers in this phase, since Dallas is going to deliver the software tools the engineers need to wake up the base-band. And since Dallas is going to perform the RF-wakeup, two RF engineers and possibly one base-band engineer from TIDK need to travel to Dallas to be present during these phases, and it is discussed who should go.

The following phase will be the “system wakeup” which will take place at a TI site in France. Again the engineers are going to be involved, and one or two of the engineers have to travel to the TI site in France to be present during that phase. They discuss who should go there; apparently no one seems very eager to go. One argues that he thinks Nice, close to the TI site, is a terrible place to be, too many people during summer, nobody during winter.

The meeting is progressing as usual, but this day is special, and it will be remembered as such by the engineers. It is also a day that will mark an important change in a quite remarkable company’s story. Earlier that day, the engineers had received an email from the headquarter announcing the closure of one R&D project in TI, a project in which TIDK has a stake. As a result of this closure a number of employees will have to be laid off worldwide.

Everybody knows this will affect engineers in TIDK, and that causes anxiety among the engineers. TIDK has had a remarkable growth rate and has in 2004, 2005 and 2006 won the Danish IT newspaper Computerworld’s prize for the highest growth in Denmark. Does this day mark the end of this success story? The anxiety shows its face at the beginning of the meeting in the small-

talk among the engineers. One argues that they should have had the news from the human resource manager at their own site, not just in a general e-mail from headquarter sent out to all. The project manager replies that this is normal procedure in American corporations. This leads to ironic comments among the engineers such as “Oh, I should have remembered that....”

This is a day in a multinational corporation, a day, which is different, from a day in a small local company in the telecommunications cluster called NorCOM in Northern Jutland, Denmark. And this difference, between what is ‘normal’ among these engineers in TIDK located in the NorCOM cluster, and what is ‘normal’ in an American MNC, is part of the central topic of this PhD thesis. But to explain exactly what this thesis is about, I need to go back to the very beginning of my work.

As a geographer the interconnectedness of companies in a globalized world and their location has always interested me. When I started work on this thesis, I was interested in the interplay between the globalized world and the local place, and one sphere in which I saw this tension, was in the interplay between industrial clusters and multinational corporations.

On the one hand, we have the industrial cluster, the discussion of which can be traced back to (Marshall 1920)’s legendary contribution, with the notion of something “in the air”, and which was put on the agenda scientifically and politically throughout the world by (Porter 1998b). Of course the literature on industrial districts, cluster, industrial milieu etc. is big and includes a number of concepts, see for example (Martin & Sunley 2003) now classical critique of Porter’s cluster concept, and (Lorenzen 2005)’s editorial on the ‘terminological soup’ characterizing the cluster literature. But nevertheless, one unifying feature of all these strains of the cluster literature is the geographical concentration, the space, or the ‘localness’ of the cluster.

On the other hand, we have the literature on the MNCs roaming the world, tapping into different regions. It is known from the literature on MNCs, that that MNCs increasingly internationalize R&D activities to exploit and/or augment their technological capabilities (Criscuolo, Narula, & Verspagen 2005; Kuemmerle 1999). A number of studies have examined the consequences of locating MNC subsidiaries in clusters (Birkinshaw & Hood 2000; Buckley & Ghauri 2004; Dunning & Lundan 1998; Frost 2001). These studies, however, are focused mainly on the consequences for the subsidiaries and the MNCs, e.g. access to knowledge, employees etc., and only to a lesser degree on the consequence for the cluster experiencing the entry of MNCs. So here we have the global players forming networks around the world tapping into the locality in clusters.

What happens when these two meet, when a ‘global’ MNC taps into the ‘localness’ of a cluster? It is known from the literature on MNCs and regional development, that the relationship between MNCs and regions, and hence also clusters, is a two-way relationship (Cantwell & Santangelo 2002; Coe et al. 2004). And (Birkinshaw & Hood 2000) argued that subsidiaries located in clusters over time develop characteristics which are similar to the characteristics of other firms in the cluster. They do not explain in detail, however, *how* subsidiaries located in clusters apparently develop characteristics similar to the other cluster companies; they only give suggestions as to why this might happen. But what are the actual dynamics? How does the processes within the cluster influence what goes on inside the MNC and vice versa, how do the presence of MNCs influence the dynamics within clusters? This was the question I originally set out to answer in my PhD, and the first version of my research question therefore became:

Research question, 1st formulation: How does the entry of global MNCs into clusters influence the dynamics within such?

1.1 When Global MNCs meets Local Cluster

Having chosen this research question I turned to the literature on clusters, to create a theoretical framework for conceptualizing the relationship between clusters and MNCs. Since the late 1990s, there have been a recognition in this literature, that creation and diffusion of knowledge within clusters are the main reasons for clusters.

The idea about diffusion of knowledge within clusters, and its importance, was already present in the now famous contribution by Marshall (1920), in the discussion about the mysteries “in the air”. The seminal contribution by Porter (1998b) also highlights the diffusion of knowledge, for example in the discussion about how rivals monitor each other in clusters. Brown & Duguid (2000a) puts creation and diffusion of knowledge at the heart of their explanation of clusters building upon the concept of communities of practice. Maskell (2001) puts knowledge at the center of his ‘knowledge based theory of geographical clusters’, and elaborates upon this in (Malmberg & Maskell 2002; Malmberg & Maskell 2006; Maskell & Lorenzen 2004). Knowledge also play a key role in the theory about buzz and pipelines and their influence on clusters (Andersen & Lorenzen 2007; Bathelt, Malmberg, & Maskell 2004; Maskell, Bathelt, & Malmberg 2005), as well as in other contributions on cluster such as (Iammarino & McCann 2006; Malmberg & Power 2003). There is despite the focus on knowledge, and because of the many competing theories and concepts in the literature, different views on how creation of knowledge and flows of knowledge within clusters actually work, and how important they are for companies located in clusters.

Since learning was described as the key process in clusters in the cluster literature, I concluded that to illuminate in more detail what happens when MNCs enters clusters; I needed to analyze how such entry influenced learning processes, both within the MNCs and within the clusters. I could therefore make my research question more specific, and the second version of my research question therefore became:

Research question, 2nd formulation: How does entry of global MNCs into local clusters influence dynamics related to learning within such clusters as well as learning processes within the MNC?

This meant that a theoretical framework focusing on learning and knowledge was needed. Turning towards the literature on learning in companies Amin & Cohendet (2004) argued that it was possible to group varying theories about firms into three main theoretical approaches in relation to knowledge: The Strategic-management approach, the evolutionary-economy approach and the social-anthropology-of-learning approach. The strategic-management approach is mainly rooted in the discussion of core competences within firms (Prahalad & Hamel 1990) and the resource based view of the firm, and focus is on the design of the firm. The evolutionary economic approach builds upon the work by Nelson & Winter (Nelson & Winter 1982), where focus is on routines within firms. Finally, in the social-anthropology-of-learning approach which is based on the works of (Wenger 2004) and (Brown & Duguid 1991) the focus is on communities of practice within and around firms.

I wanted to break away from the rational thinking permeating the strategic management literature, where the organization of firms, and to an extent the configuration of learning processes within these, are conceptualized as rational processes, where managers investigate the environment in the cluster and adapts to this. Therefore I stayed with the two latter ones; the routines and the communities of practices. I went through the literature on routines, the seminal work by (Nelson & Winter 1982) and newer contributions such as (Becker 2004; Becker 2005a; Becker et al. 2005; Becker 2005b; Cohen et al. 1996; Feldman & Pentland 2003; Narduzzo,

Rocco, & Warglien 2000; Pentland & Feldman 2005; Reynaud 2005). The routine literature however also fell short, because the link to the cluster literature was missing, and I found it hard to conceptualize how the environment outside the organization influenced the routines within an organization from this perspective. The third strain of literature, i.e. communities of practice, made it easier to form this link.

The third strain of literature focusing on learning, with the contribution of Etienne Wenger on situated learning and communities of practices (Lave & Wenger 1991; Wenger 1998; Wenger 2003; Wenger & Snyder 2000) and John Seely Brown and Paul Duguid (Brown & Duguid 1991; Brown & Duguid 2000a; Brown & Duguid 2000b; Brown & Duguid 2001; Cook & Brown 1999) were, as far as I could see, the best suited theoretical framework for my research question, because it made it possible to conceptualize learning as something which occurs in communities which could be within organizations, but also across organizational boundaries. In other words, this framework could be used to conceptualize people within a local firm being acquired by a MNC, as potentially being parts of communities both within the cluster as well as within the MNC organization.

Having found a theory in (Wenger 1998) which I thought could be used to frame my research, and inspired by the writing on case studies by (Flyvbjerg 1998a; Flyvbjerg 1998b), and the tradition for the use of case studies in the literature on communities of practice, I decided to do a case study of one small local company in a high-tech cluster which was acquired by an MNC. MNCs can, according to (Lorenzen & Mahnke 2002), enter a cluster through either Greenfield investments, joint ventures or acquisitions.

In the case of acquisition of local companies, we have a local company, which it is plausible to assume must be part of the local environment, with employees being part of different local communities of practice, which becomes part of a global organization, potentially containing different globe spanning communities of practice. I thought that by studying the learning processes within such an organization, both how they had changed from the phase before the acquisition to the phase after the acquisition, as well as how knowledge was currently developed in the interstice between the local cluster and the global organization, it would be possible to illuminate in more detail how MNCs entry influence learning processes within clusters. The assumption was, that if a MNC subsidiary is created as a greenfield investment, or a joint venture, then it is likely to be more difficult to distinguish how the practices within this company differs from the practices in "local companies" given that it is likely to be very difficult, if not impossible, to compare to other companies in the cluster given that no two companies are exactly the same. On the other hand, in the case of acquisitions, there is a "before" phase where it must be assumed that the practices are relatively "local", and an "after" phase, where it is plausible to assume that the local practices have been influenced by the practices from the global company. And thereby by investigating the changes of practices over time in the acquired company, it becomes possible to illuminate the impact of the MNC entry on the learning practices.

And so I started a case study of one such R&D company in a high-tech telecommunication cluster¹, utilizing interviews and observations to collect empiric data, in line with the tradition in the literature on communities of practice, see for example the seminal study by (Orr 1996) which is often used as a reference. After I had been collecting data for a while, both within the company I had chosen as my case, TIDK, as well as in the cluster in which it was located, the NorCOM cluster, interviewing key persons to understand the nature of the cluster, I realized that something was missing from my framework.

¹ I will later present the case study in more detail.

1.2 The missing aspect

I developed a hunch, which was that my focus on learning, using Wenger's theory of communities of practice, meant that I was overlooking something important. And then I realized that this was the notion of power. Of course the acquisition had meant that power relations had changed, and this had implications. This showed in observations and interviews. Engineers or managers had ideas about what to do, but now suddenly a manager on the other side of the globe was in charge. This was a relatively simple display of power, in the classical understanding of power as person A makes person B do something (Clegg 1989). What I realized was that what I was seeing had to be conceptualized in more advanced ways to capture the complete story.

And this is why I started this thesis with the description of the meeting which I observed in 2007 at my case company, TIDK. What I observed in this meeting was not only a relatively simple display of power in the fact that HQ in Dallas makes a decision which impacts people on the other side of the globe in Aalborg. The decision in Dallas, its implications in Aalborg, and the belief among the engineers that it should have been announced differently, convinced me that I had to change my theoretical approach, to one which included the notion of power, and did so in a more complex manner. I had to analyse, how power relation had made the engineers in the room the subjects they were, with the identity they possessed and the behaviour they displayed. They were part of the MNC organization, but as the comments showed they apparently felt that they were different from TI employees in Dallas. What was 'normal' in TI Dallas was not 'normal' in their perspective. They felt different from TI Dallas. My interviews showed that they also felt different from TI France. How had they become that? Were they thus like other NorCOM engineers, or were they a hybrid? What had made these people what they were as subjects in the interstice between TI and the local cluster? There were some structures influencing the dynamics within the COP's which I could sense the impact of, but not conceptualize using Wenger's theory.

The reason why I realized this was that while I was reflecting on the initial findings from my case study, I came across a famous French author, Michel Foucault. I was at a seminar given by Bent Flyvbjerg dealing with Foucault and Habermas, and at that seminar I realized, that maybe Foucault's works held the ideas and concepts I needed in my analysis. I therefore turned to Foucault's writings on power.

1.3 Analyzing clusters in a power perspective

We can, as (Clegg 1989) rightfully pointed out, trace the roots of different theories on power back to the writings of either Tomas Hobbes or Nicòlo Machiavelli. The classical theories on power presented by Floyd Hunter and Robert Dahl, the theories on non-decision by Peter Bachrach and Morton Baratz, the theory on the third dimension of power by Steven Lukes and finally the structuralistic views on power presented in for example Marxist theory, can all be traced back to Hobbes view on power because these theories are preoccupied with possession, sovereignty and control. Conceptualizing power in this perspective will lead us to understand power in an organizational context in a rather simple Hunter & Dahl perception as "A makes B do something", or, if we make things slightly more complicated in a Bachrach & Baratz perspective where "B does something because he expects A to wish it" etc. All instances which lead us to ask the question: who has the power?

Opposing this line of thought where power is something which is possessed, is according to (Clegg 1989), the post-structural theory presented by Foucault who builds on views presented by Machiavelli and Nietzsche, and therefore he focuses on exercise, strategy and struggle. Turning to the points made in publications such as (Foucault 1972;Foucault 1984a;Foucault 1991;Foucault 1998), the question no longer is who has the power, but rather the point is that

power is to be understood as the configuration of force relations existing at a given point in time and space. Furthermore, Foucault's goal was actually not to investigate power for the sake of power, but rather to investigate how people are made into subjects in society, and in this endeavour the notion of power became important, as well as the relationship between knowledge and power. Foucault thus shows how we can analyse how people are shaped as subjects, or how 'objects' such as the Prison, or 'concepts' such as the notion of Madness, are constructed in the field of power relations between discourses and practices at specific points in space and time in society.

Then I realized that Foucault's ideas actually held the piece of the puzzle I was missing in my analysis. This insight made me jump in the chair, and I dwelled into Foucault's works. In his works I saw a way of conceptualizing the relationship between power and knowledge, which meant, that my empiric data started making sense. And further, Foucault's ideas and Wenger's ideas were actually relatively complementary, although the two authors had different analytical focuses. I therefore paused my case study, to dive into Foucault's work and went through his most famous writings, reading some of his texts several times, as well as secondary literature on Foucault to understand what he was actually saying.

As I worked with Foucault's writings I realized that with Foucault's ideas developed in his writing on archaeology and genealogy, I was able to develop a conceptual understanding of the world, and a methodological approach which made it possible to analyzing how these engineers I was studying in TIDK had become the subjects they were. Thereby I could analyze the relationship between clusters and MNCs at a micro level, by uncovering how this relationship shapes the identity of the workers in the MNC subsidiaries in the cluster. This also made sense in relation to Wenger's theory, because while the community of practice theory is indeed a theory about situated learning, building on some of the ideas (Lave & Wenger 1991) developed, it is also a theory about identity and how identity is constructed in such communities. We should not forget, that (Wenger 2004) devotes half of his book to the issue of identity, and admits that the power issue of his work needs elaboration.

Shortly put, what I realised was that to understand how MNC entry influence the dynamics in a local cluster, the object to analyse was not the learning processes occurring in the interstice between the MNC and the cluster, but rather how people in the cluster were constructed into specific subjects in the interstice between the local cluster and the global MNC organization. It was therefore necessary to reformulate my research question again, into the following:

Research question, 3th formulation: How are people within companies in clusters, which become acquired by MNCs, constructed as subjects?

As I worked on investigating this going back and forth between the theory and my ongoing case study, I realized that this question only addressed the first of two steps, which were necessary to fully understand the relationship between the cluster and the MNC.

The second step was to analyse how the cluster had been constructed. Studying an organization which had been acquired by an MNC made it relatively easy to understand the changes emerging from the acquisition, but the analysis showed, that the background from which this acquired company came, i.e. the specific NorCOM cluster, also had an influence on shaping the engineers. Or simply put, to understand how the subjects were shaped in the interplay between the MNC and the cluster, it was not enough to look inside the MNC. I also had to look at the cluster, and analyse how the cluster had emerged, and how the NorCOM cluster had become what it was. I had in my first approach implicitly assumed that the cluster was a constant thing. I described above how I had believed that when a local company within a cluster was acquired by MNCs,

then it was part of local communities of practice, and because of the acquisition the workers became part of new communities inside the MNC. I therefore believed that by studying how the company changed during the acquisition, I could identify changes arising due to the acquisition. The issue was that the cluster was also changing simultaneously, and Foucault's ideas actually made it possible to create an analytical framework for studying how the cluster was constructed and reconstructed over time, and what role the presence of MNCs played. The point which I missed, and first realized that I missed when I read Foucault, was that the people in the cluster as well as the cluster were constantly reconstructed in the interstice between different discourses and practices, which were influenced both from within the cluster and by the MNC. The point is therefore not to investigate the influence of the MNC on the cluster and vice versa, but instead to investigate how the reality within the cluster is constructed in discourses and practices between the two spheres, i.e. between the local and the global.

This also means that whether people work within MNC subsidiaries or local companies in a cluster becomes a secondary issue. The important thing to analyse is the discourses and practices constructing people within clusters into the subjects they are, and how they are reconstructed over time. The impact of MNCs and local companies on these discourses and practices becomes important parts of the analysis, but not the focus. The focus must be on how the people are continually constructed. And the object of the analysis thus becomes the discourses and the practices emerging in the interstice between the local cluster and the global MNCs.

The Foucauldian approach thus makes it possible to overcome theoretical distinctions between the "localness" of the cluster and the "globalness" of the MNCs. Implicit in the current literature we find a distinction between the localness of the cluster and the globalness of the MNCs, and hence a polarization between MNCs and local companies which means that it is assumed that the role of MNCs and locals are different. It was actually this distinction which inspired me to choose this topic as I described in the beginning. But the Foucauldian approach places the subject with a specific identity in the middle of the analysis: how are the identities of subjects within clusters constructed, and further, how are specific clusters constructed, i.e. how is a given cluster constructed into the particular cluster we see, with a specific sets of characteristics? This is analysed in my approach through a focus on discourses and practices, how they emerge and how they shape the subjects and cluster. And through this analysis I also include the impact of local practices and global practices and the mixture of the two where they meet in discourses and practices. This means by placing discourse and practice between the 'local' and the 'global' and focusing on identity, and by using the ideas from archaeology and genealogy to conceptualize the relationships between discourses and practices, through a focus on power, I am able to overcome the polarization between local companies and MNCs in the analysis.

Let me give a short example from the case study to exemplify this. The case study shows, as I will discuss in detail later, that whereas a struggle between local companies in the NorCOM cluster and external MNCs had indeed been an important part of what constituted and unified the NorCOM cluster in the 1990s, and shaped the identity of the people within it, the situation during the 2000s was more complex. By the 2000s the MNCs constituted simultaneously both an 'us' and a 'them'. People in the cluster still had specific approaches to their work which the analysis trace back to the discourses and practices emerging in the early 1990s, and therefore the MNC employees in other sites with other practices constituted a 'them', as shown in the description of the meeting I started this thesis with. However, in that phase the companies in the cluster, of which the majority was MNC subsidiaries, were also joined in a struggle with other organizations in the region: parts of the university, the municipality, the county as well as the IT Forum business association for the IT industry. This struggle unified people in the cluster in a way so that the relationship between local firms and MNCs was that they were in the same boat, seen locally. People in MNC subsidiaries and local companies thus joined each other in a struggle

against other institutions and organization in the region. And MNCs as such also became part of an 'us' in the cluster.

My approach thus opens up possibilities of illuminating in new ways the relationship between MNCs and local cluster companies, because it does not as a starting point put these as opposing entities, but treats these as entities which comes together in the processes leading to the construction of different discourses and practices, and it is through these discourses and practices that people within cluster are created as subjects, as well as the clusters as objects.

Foucault's ideas developed in his discussions about genealogy and archaeology, are thus relevant and needed for cluster analysis, because they represent a complex understanding of the relationship between power and knowledge, and practice and discourse, which makes it possible to analyse how people within clusters are constructed and reconstructed over time. And thereby how they change, from a perspective which lets the empiric data speak for itself, without forcing them into a theoretical framework which holds a priori values as to what is relevant and what is not relevant for the analysis. They are also important because Foucault's concepts make it possible to analyse how clusters are constructed, i.e. how they emerge in the sphere of discourses and practices between different actors. And also importantly, the approach which builds on Foucault's ideas is actually complementary with both the contributions by Etienne Wenger on situated learning in communities of practice, and with the approach to MNCs as social constructs.

To sum up, having gone through a learning process, which was in no way linear, I realized, that while I had been trying to understand how MNC acquisitions of local companies influence such organizations and the cluster which they are part of, I had also been moving towards another necessary and important project, namely how to analyze how clusters are constructed through discourses and practices. I believe that if we use this methodological approach to the study of clusters, inspired by the works of Michel Foucault, then it opens up for a whole new understanding of clusters. Having made this realization, I once again reformulated my research question, and arrived at the fourth version:

Research question, 4th formulation: How are people constructed as subjects within companies in clusters, which become acquired by MNCs, and how are the clusters of which they are part constructed as clusters?

As I worked my way through Foucault writings and his approach to science it became clear, that it was, to use the wordplay of (Knights 2002) in relation to the use of Foucault in organizational studies, not possible to "write Foucault into cluster studies". What I had been trying to do was to fit Foucault into the conventional cluster study approach. I had tried to use his works as a theory on power and to combine it with other theories on the dynamics within clusters, and operationalized into a number of hypotheses which could then be investigated through empirical studies, which could in turn give rise to new theories, and thus add to the cluster literature. I shall return to what I mean by theory in chapter 4. As I tried to do this I realized that what I was doing was not a Foucauldian analysis. It was a sort of mixture which made no sense. Foucault did not make universal and predictive theories, as I will elaborate on later; he dismissed the notion of theories, so who was I trying to use his ideas as a universal and predictive theory? Or to create universal models of which he was rather skeptic? The only way in which I could use him correctly, and build on his ideas, was to adapt his way of carrying out an analysis, in other words, his approach to science.

What I needed to do instead was to write "Cluster studies into Foucault", i.e. make a Foucauldian analysis. Shortly put, I had to choose the Foucauldian approach, and then use it completely. I

could not just take some of Foucault's ideas and concepts, pick them out of a larger context, and try to fit them into the normal scientific approach found within the cluster literature. Therefore I chose the phronetic approach to social science in this thesis, using (Flyvbjerg 2001) as the basis, which is compatible with the Foucauldian approach to analysis, as I will elaborate on later. And this also means, as I will elaborate on in detail later, that the goal of this thesis is to produce context specific knowledge instead of universal theories. Therefore my fifth and final research question became:

Research question, 5th and final formulation "How were the people within TIDK constructed as subjects, and how was the NorCOM cluster of which they were part constructed?"

I will structure this thesis so that chapter two deals with the framing of this research problem. This chapter will discuss the current state of the cluster literature, the focus on learning and the weaknesses characterizing the cluster literature today. And further, why I chose the Wengerian perspective on learning. The reason for elaborating on this is that in chapter 3 I will discuss in detail what a Foucauldian analysis illuminates that a Wengerian does not illuminate, and with the discussion in chapter 2 in mind, this will help to explain why the approach I develop and use in this thesis is an important contribution.

Part II of the thesis called "An Foucauldian approach" will thereafter focus on how to use Foucault's work, chapter 3, the phronetic approach to science, chapter 4, and finally the methodology of this thesis, chapter 5. In chapter 5 I will argue in detail for the research question formulated above, and the approach to science underpinning this thesis, and develop an analytical approach to a case study to answer this question.

Part III of this thesis thereafter present the case study in chapters 6 to 8 and the discussion of this case study and the results of it in chapter 9. The rationality for the structure of Part III of the thesis will be described in part II. Finally, chapter 10 presents the conclusion.

Chapter 2: Framing the problem

To frame the problem this thesis deals with, the interplay between cluster and MNCs, let me start with the notion of a cluster. Given the objective of this thesis to investigate what happens to clusters, when MNCs enter these, it is necessary to investigate firstly, how to conceptualize theoretically what a cluster is and what dynamics that are the key dynamics within clusters. Secondly, with this established, it becomes possible to investigate the impact of MNCs on these dynamics, and hence on the cluster. It should be noted here that with this approach the cluster is placed in focus. As mentioned earlier, there are some studies which investigate what the implication of a cluster localization is to the MNC in question, and thereby places focus upon the implication for the MNC. This thesis takes the opposite perspective, i.e. what are the implications for the dynamics within the cluster.

To frame the problem of this thesis theoretically, this chapter will therefore begin with a discussion of the cluster concept in section 2.1. It will be argued in that section, that the focus today in the majority of the cluster literature is on dynamics related to learning. The conclusion to draw from this is, that to investigate how the entry of MNCs influences dynamics within clusters, it should be investigated how such entry influence dynamics related to learning within clusters.

Section 2.1 will also discuss the weaknesses of the cluster literature, and the conclusion in this discussion will be that it is necessary that future cluster studies avoid the idea of forming universal explanations of why clusters emerge and how they function using theoretically frameworks which eclectically combine many different theories. Instead it is suggested that researchers turn towards the micro level, and rigorously conceptualize theoretically and investigate empirically the dynamics occurring between people within what is referred to as clusters, i.e. the processes shaping the identities of these persons, their learning, and their behaviour.

On the basis of this section 2.2 will focus on two perspectives on learning which have been used in the cluster literature. One is the theory on tacit and explicit knowledge originally developed by (Polanyi 1967) and made influential in organizational studies through the works of Nonaka in particular, see for example (Nonaka, Toyama, & Konno 2001; Nonaka 1994). The other is the theory on communities of practice developed by (Wenger 1998). To investigate the strengths of these two approaches, section 2.2 present how these two theories frame learning and knowledge.

The second of these theories, the community of practice theory, was, as discussed in chapter 1, chosen as the starting point for a case study of how the entry of MNCs into clusters influence learning within these. However, as also discussed in the beginning, the case study, around which the rationalities will be discussed in Part II of the thesis, showed that the focus on learning was misguided. To understand in more detail how the entry of MNCs influences the cluster, focus had to be placed on how the identity of subjects, and their behaviour, is constructed within clusters in which MNCs enter. For this focus the analytical approaches developed by Michel Foucault are better tools than Wenger's theory on learning. While working on the case study I therefore decided to dismiss the analytical focus on knowledge, and instead turn to a Foucauldian analysis of the dynamics through which subjects in cluster, as well as organizations and the very notion of a "cluster" are constructed.

The value of the case study methodology is, as I will elaborate on in chapter 4, that when the researcher goes into detail with the empiric data, and continuously goes back and forth between theory and empiric data, then it can lead to realizations of shortcomings in the theory. And this

was exactly what happened in my work. I realized, by looking at the empiric data collected in my case study, that to understand the changes occurring in TIDK, following the acquisition of ATL Research by TI, the focus on learning was insufficient. I had to focus on another level, the construction of subjects within the organization I was studying, the construction of the organization, as well as the construction of the cluster itself through different discourses and practices. In other words, I had to uncover the dynamics through which the people within TIDK as well as TIDK itself were constructed, and it occurred to me that to understand this in detail, it was also necessary to investigate how the NorCOM cluster in which TIDK was located had been constructed as an entity through different events, discourse and practices.

To reach this goal the works of Foucault presented two powerful tools, the genealogy and the archaeology, which could be turned into the analytical frameworks I needed. But how do I make this argument here, in this thesis, where I have to report the research? How do I explain what lead me to that realization while I went back and forth in my empiric data, and discussed the issues I saw with people in TIDK and in the NorCOM cluster as well as with different researchers?

I will argue for the need for the Foucauldian in Part II of the thesis, when I have presented Foucault's ideas in chapter 3. There I will discuss what Foucault's methods and ideas can illuminate which Wenger's theory only captures indirectly. It should be noted, that there is no direct logical theoretical line from a Wengerian focus on learning to a Foucauldian focus on power and the construction of subjects. There is, however, a similarity between the two, they both focus on identity, and this can be used to understand what Foucault captures which Wenger does not. Wenger devotes a large part of his work to a discussion of identity, and Foucault spent most of his career investigating how people are made into subjects in society. The main difference between the two is that whereas identity is something which people to a certain degree creates through their participation in different learning processes in the perspective of Wenger, the person is to a certain extent more subjugated in the works of Foucault. I am not arguing that identity is something which the person created freely in Wenger's perspective, and that it is something which is forced upon the person in Foucault's work. It is a misreading of Foucault work to think that he simply argued that people are constructed, dominated, in society into being the persons they are, without any agency of their own. On the contrary, he opens rooms for the agency of persons, people themselves are also responsible for the structures which emerge in society, and which are born through the perpetual struggle as well as through all the accidents and misunderstandings characterising the state of the society.

The important point to note is, that Foucault aimed his studies, and developed his analytical approach specifically to understand the rise and fall of the structures shaping the identity and behaviour of people. Wenger in his theory focused more on the learning process and how identity influenced this and vice versa. This means that while Wenger reckons that there are some structures, for example the notion of being a "claims processor" in his study, which are influencing the practices of people, and also their identity, he does not spend much effort conceptualize these, how they emerge and how they change, because this was not his focus. Foucault unlike Wenger devoted his attention specifically to such structures, and how they emerge and change, for example the notion of madness, the notion of the prison, of sexuality etc.

What I realized in the case study was, that to understand how the entry of MNCs influence cluster, then the thing to study was the identity of the people in the acquired organization and how this changed due to the acquisition, when they suddenly were located between two worlds, so to say, on one hand the global MNC and on the other the local cluster. How did their identity change as a consequence of this and what were the implications? How did their identity influence their behaviour, and hence the development of the organization in focus, and even wider, of the clus-

ter in focus and vice versa? And to conceptualize and analyze this Foucault's works presented the best starting point.

This realization meant that I, while working on the case study abandoned the analytical framework based on the work of Wenger, and started developing a new framework based on the works of Foucault. Since I did not do a Wengerian case study of learning, I will not go into detail with this theory in this thesis. What I will do instead is to mention it in chapter three to argue why a Foucauldian approach is better suited for my objective.

This meant that the localization of this thesis in relation to the cluster literature changed. It moved from a study of learning in clusters located in the mainstream of the cluster literature, to being a study based on analytical framework based on power investigating the structures shaping the identity and behaviour of people in cluster through a focus on power-knowledge relations, events and discourses and practices. This places this thesis in a very small line of literature dealing with power in relation to clusters. Actually, the word literature is maybe too big, since I have only been able to locate one publication which tries to conceptualize clusters using a perspective on power. Apart from this power only emerges in discussion of the weaknesses in the cluster literature where it is argued that the lack of focus upon power is a weakness. Section 2.3 will therefore discuss this issue.

The move to a Foucauldian approach to the case study, however, brought me closer to another stream of literature, which is a relatively new stream of literature treating MNCs as social constructions. Section 2.4 will therefore discuss how this thesis is located in relation to this literature.

By first presenting the rationalities which lead to the starting point for the case study, and the focus on learning, in section 2.1 and section 2.2 and thereafter how the change in focus to a Foucauldian approach places this thesis on relatively unexplored grounds, given the limited focus on power in the cluster literature in section 2.3, this chapter will show how this thesis is framed in relation to the existing literature in the field. It can however be said, as section 2.4 will argue, that this thesis takes an approach which falls closer to a newer approach to the study of MNCs and opens this up to include the analysis of clusters.

2.1 The cluster concept

If we take a helicopter view at the huge and diverse literature dealing with clusters, we see that there are several different strands. Key contributions in the literature are of course the first seminal contributions by (Marshall 1920) on industrial districts and the contribution by (Porter 1998b) on clusters, which put the issue of clusters on the agenda worldwide in scientific circles as well as in business and policy circles, and became 'the standard' in the field, as argued (Martin & Sunley 2003). Porter's definition is, quote:

"Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate." (Porter 1998a, p.197-198)

This definition is relatively broad and elastic, as I shall return to later. Around the turn of the millennium, the literature had become a mess of different concepts and theories, and thus (Lorenzen 2005) characterized it as a terminological soup. According to (Martin & Sunley 2003), a number of concepts were in play, for example: 'industrial districts', 'new industrial spaces',

'territorial production complexes', 'neo-Marshallian nodes', 'regional innovation milieu', 'network regions' and 'learning regions'.

Looking at this diverse literature it emerges, that there are several conceptualization of what clusters are, why they exist and how they function. It therefore becomes a challenge to conceptualize clusters and change in these theoretically, to be able to investigate how acquisitions by MNCs influence the dynamics within clusters, because, what perspective should be used?

To position this thesis I will take as my point of departure (Lorenzen 2005), who makes some important points about the different streams within the cluster literature, and the issue of conceptualizing change in clusters. (Lorenzen 2005) argues that there are two main traditions in the study of clusters: the "new economic geography" tradition and the "regional studies" tradition. The first focus on model building, and tries to create models explaining the existence of clusters based on multiplier effects and cumulative causation, the last focuses on institutions and social dynamics which are seen as forming the basis for clusters. Looking at these two traditions and the issues discussed in them (Lorenzen 2005) argues, that a critique can be raised against both which is:

"... they are preoccupied with the growth and substance of clusters, rather than with their change. The study of clusters and change encompasses (at least) three problems that have been relatively neglected so far:

Why do clusters *arise*? (i.e. what may make agglomerations of companies, institutions, and positive externalities 'sufficient' to trigger cumulative causation, growth, and further agglomeration?)

Why do clusters *decline*? (i.e. what may interrupt the cumulative causation behind their growth and substance?)

Why do clusters *shift*? (i.e. what may introduce new types of companies, institutions, and positive externalities to such an extent as to create a new cumulative causation?)"

(Lorenzen 2005, p.204)

According to (Lorenzen 2005) change can be conceptualized in two ways from the cluster literature: by focusing on exogenous factors or by focusing on endogenous factors. An exogenous perspective conceptualizes clusters as emerging, changing and dying due to impacts from the outside, which means that in relation to globalization and MNCs, points to investigate would be issues such as the changing patterns of foreign direct investment, the impact of new transport and communication technologies etc. On the contrary, the endogenous perspective places focus on dynamics within clusters. And in this perspective (Lorenzen 2005) lists three approaches. First, the new economic geography approach where focus is on modelling and externalities. Due to this focus this approach has little to say about change in clusters. The second approach is described by (Lorenzen 2005) as a "historically oriented" approach, where focus is placed on social institutions:

"Research in this tradition is mainly descriptive, but explains change of cluster structure in terms of rises, shifts, or disruptions of social institutions, for example, through immigration (or emigration), local companies 'outgrowing' clusters and breaching social hegemony, or disruptive policy action." (Lorenzen 2005, p. 205)

The third approach is described by (Lorenzen 2005) as "economic", or at least partly so:

“This is the scholars who focus upon inter-company relations and apply transaction cost economics and other perspectives on coordination in order to explain clustering. In this view, knowledge externalities and cumulative causation in clusters are determined by social institutions that facilitate incentive-related as well as cognitive coordination, lowering transaction cost and facilitating localized learning...” (Lorenzen 2005)

Unifying these last two approaches is the fact that social institutions, social processes and learning are understood as the basis for the rise, change and decline of clusters.

Given the objective of this thesis is to uncover how dynamics within clusters change, and hence how clusters change, when MNCs acquire local firms within a cluster, it is necessary to follow the endogenous path to the conceptualization of clusters and change in these. Disregarding the new economic geography modelling approach, since this approach presents little advantage when it come to conceptualizing how MNC acquisitions influence dynamics within clusters, and possibly changes these, it is necessary to illuminate in more detail the two social approaches, the “historical” and the “economic”, to investigate whether they present theories which can form the basis for this thesis.

2.1.1 The basis for the historical and the economic approaches

The basis for the “historical approach” is to be found in a number of discussions emerging throughout the 1990s dealing with clusters, industrial districts and regions. In the early 1990s works on national innovation systems (NIS), by for example (Lundvall 1992), were interpreted in a regional perspective, which gave rise to the concept of regional innovation systems (RIS), with Philip Cooke and Bjørn Asheim as two main authors, see for example (Braczyk, Cooke, & Heidenreich 1998;Cooke 1992;Cooke 2001;Cooke 2005) and (Asheim & Coenen 2005;Asheim & Gertler 2005;Asheim & Isaksen 2002).

Throughout the 1990s the concept of collective learning also gained momentum see for example (Asheim 1996) and (Lawson & Lorenz 1999). While this stream of literature was closely related to the literature on RIS, given that the two had a similar objective to understand dynamics related to learning and innovation within regions, districts, and clusters, it used a different theoretical basis. Focus was placed on the micro dynamics occurring within organizations. In the writings on collective learning focus was thus moved from the region or the district and to the organization.

Ideas and concepts were taken from for example the seminal work on the behavioural theory of the firm by (Cyert & March 1992), the seminal work on organizational routines by (Nelson & Winter 1982), the concepts of tacit and explicit knowledge developed originally by (Polanyi 1967) and the ideas of dynamics capabilities by (Teece, Pisano, & Shuen 1997), to mention of few of the key concepts.

Another relatively large discussion dealing with the issue of knowledge in clusters placing the analytical focus on organizations and the persons within them, has been the discussion about knowledge spillovers. The basis for this discussion is found in the writing on knowledge trading between firms, where key contributions are (Von Hippel 1987) and (Schrader 1990). This literature presents diverging views on the role of knowledge spillovers in clusters. On the one hand, according to (Krugman 1991) knowledge spillovers are not an important force for agglomeration. (Martin 1999) on the other hand sees them as an important force for agglomeration. (Feldman 1999) provides a survey of studies that suggest the presence and importance of knowledge spillovers. (Breschi & Lissoni 2001a) do not dismiss the existence and importance of knowledge spillovers, but they argue that what might appear as knowledge spillovers in datasets and methods might often be pecuniary externalities and not knowledge spillovers. (Dahl &

Pedersen 2004) show through an empirical study that knowledge do flow through informal relations in clusters, and (Giuliani 2005) suggests that knowledge do flow in networks within cluster rather than being available to every member of the cluster, just to mention some of the contributions in this line of discussion. The literature on learning in relation to clusters, districts or region emerging through the 1990s and 2000s has been relatively diverse in its focus, and many concepts have been in play.

There is a soft boundary between the ideas developed in this “historical approach” and the ideas developed in what (Lorenzen 2005) coins the “economic” approach. Both approaches utilize some of the same concepts, and the main difference is to be found in the approach to empirical studies. Whereas the “historical approach” is characterized by a combination of theoretical and empirical contributions, the “economic” approach is relatively more focused on creating theoretical explanations of the emergence and evolution, which means that empirical studies to back these explanations are often missing. This is where the “economic” line of thought becomes clear, focus is on model building, but instead of the economic models made in the new economic geography, focus is placed on conceptual models using different theoretical concepts relating to learning and knowledge.

Leading the way in the “economic” approach was for example (Maskell 2001) who argued, that learning and knowledge should be the core in an explanation of clusters, and tried to explain clusters using a framework building on the notion of cognitive distance. Taking this argument further (Malmberg & Maskell 2002) called for a “knowledge-based theory of spatial clustering” and argued, that explanations of clusters focusing on shared labour forces, lowered transaction cost or knowledge spillovers due to proximity fell short in explaining the evolution of clusters, which was for example illustrated by the presence of many theoretical concepts not supported by empirical evidence. Several contributions have followed in this line of literature, (Malmberg & Maskell 2006; Maskell & Lorenzen 2004; Maskell & Malmberg 2007) amongst others the widely cited contribution about how buzz and pipelines shape the evolution of clusters (Bathelt, Malmberg, & Maskell 2004; Maskell, Bathelt, & Malmberg 2005).

2.1.2 The weakness of the cluster literature

The wild growth of the cluster literature has also become its weakness, as argued by (Lorenzen 2005). While the literature has grown to a huge size by now, it has done so in a way which has caused several problems. In their seminal contribution (Martin & Sunley 2003) levelled a critique at Porter’s cluster concept, which otherwise form the basis for much of the academic cluster literature. And this critique is important for understanding the weaknesses characterizing most of the cluster literature today. Although (Martin & Sunley 2003) dealt with Porter’s model, they touched on some issues which not only haunts Porter’s model, but indeed most of the current literature. Let us therefore look at some of their key arguments.

One point of critique was the nature of the cluster concept:

“... Porter’s cluster metaphor is highly generic in character, bring deliberately vague and sufficiently indeterminate as to admit a very wide spectrum of industrial groupings and specializations...

... Rather than being a model or theory to be rigorously tested and evaluated, the cluster idea has instead become accepted largely on faith as a valid and meaningful ‘way of thinking’ about the national economy, as a template or procedure with which to decompose the economy into distinct industrial-geographic grouping for the purpose of understanding and promoting competitiveness and innovation.”(Martin & Sunley 2003, p.9)

The vagueness results, as (Martin & Sunley 2003) argue, in a number of issues in relation to identifying clusters. One is the matter of scale, how large can a cluster be? Porter himself argues that cluster can range in size from a city to several neighbouring countries, quote

"The geographic scope of clusters ranges from a region, a state, or even a single city to span nearby or neighboring countries (e.g. southern Germany and German speaking Switzerland). The geographic scope of a cluster relates to the distance over which informational, transactional, incentive, and other efficiencies occur" (Porter 2000, p.16)

This span of scales is one issue relating to the geographical scope, another is the question about whether clusters are indeed something geographical defined by a geographical proximity among the constituent firms, or whether a cluster is something functional defined by the functionalistic relationship between the constituent firms. Given that Porter sometimes talks about functional relationships and other times about geographical proximity, it is as (Martin & Sunley 2003) point out, difficult to precisely describe what defines a cluster. So the scope of clusters, and how to define them poses some problems, but these are not the only things haunting the concept. Turning to the content of cluster, or, in other words, what clusters are, and what dynamics that characterizes them, a number of issues also emerges, as (Martin & Sunley 2003) highlight. One weakness is the eclecticism of the concept. While (Martin & Sunley 2003) argues that theoretical eclecticism can be a virtue in some situations, it is a "dubious endeavour" in relation to Porter's work. The issue is that Porter takes bits and pieces from different theories and fuses them in his cluster concept. And this results in three problems. Firstly, (Martin & Sunley 2003) question whether the cluster concept, building on such a collection of theory bites fused together in one overall framework of "competitiveness" is indeed capable of describing what they call "the full complexity of economic, social, and institutional factors and processes alleged to underpin cluster formation, development and success" (Martin & Sunley 2003, p. 14). Secondly, they question whether it is indeed possible to construct a universal theory covering all cluster types and processes, quote "without degenerating into superficial generalities of the sort that have surrounded industrial districts" (Martin & Sunley 2003, p. 14). The problem is, in relation to these two issues, according to (Martin & Sunley 2003), that by combining ideas from different theories into the cluster model, the theoretical basis for the model itself becomes weak, because some of the theories fit together logically while others do not, and empirical validation thus also becomes a problem:

"The difficulty is that Porter's cluster model actually combines ideas from quite different perspectives – from agglomeration theory to social network theory – some of which are complementary and other much less so. As a result, empirical observations of clusters and clustering can then be interpreted in quite different ways, thereby buttressing a generalized notion of the benefits of clustering by conflating elements for which there may actually be little evidence with elements to which the evidence more directly relates" (Martin & Sunley 2003, p. 16)

Thirdly and finally, they question whether the cluster theory indeed does illuminate the socio-institutional processes, which Porter describes as key to clusters. In relation to this they argue, that the actual dynamics remains a black box in Porter's work:

"... the social dimensions of cluster formation and cluster dynamics remains something of a black box in Porter's work. While e stresses, for example, the importance of local social networks for the production and flow of information and knowledge within clusters, these processes are conspicuously under-theorized in his cluster model. And even in his case study examples, there is little explicit empirical investigations of these social and knowledge networks, which more often than not are simply inferred from the presence of particular formal and informal institutions within a cluster." (Martin & Sunley 2003, p. 16-17)

Turning to the empirical basis for the model, (Martin & Sunley 2003, p.18) argue that most empirical cluster investigations are “surprisingly unsophisticated and stylistic”. (Martin & Sunley 2003)s’ elaborate critique of Porter’s cluster thus highlights at least four weaknesses: the theoretical eclecticism, the aim to construct a universal theory, the black-boxing of social dynamics and the weak empirical basis, and these are interesting, because it is actually not only Porter’s contribution which is haunted by these four weaknesses; a large part of the cluster literature does indeed suffer from these weaknesses. (Martin & Sunley 2003) point to this, when they argue in relation to learning in clusters:

“The problem of conceptualizing and empirically analyzing knowledge networks and other ‘soft’ socio-cultural-institutional features of clusters and spatial economic agglomerations is not, of course, confined to Porter’s work. There is in fact an increasing tendency to explain cluster formation and development in terms of local knowledge and ‘collective learning’...

...This local knowledge ‘cluster theory’ itself faces several difficulties. First, despite the numerous assertions that ‘tacit’ knowledge is the key to business success, this remains an unsubstantiated and obscure proposition...

Secondly, many accounts refer to localized tacit knowledge without making clear precisely what it is, or how it acts as a source of competitive advantage (Martin & Sunley 2003, p. 18).

The problem which (Martin & Sunley 2003) touch on here, is that the theoretical conceptualization of social dynamics within clusters are superficial in large parts of the contributions within both the “historical approach” and the “economic approach”. Making a similar point (Benner 2003) aimed a critique against the concepts of learning regions, and much of the literature dealing with such, including most of the literature on learning in cluster, and localized learning, when he argued:

“One of the major challenges facing research on economic learning processes is to identify the specific mechanisms and processes that make economic learning effective, particularly the relationship between human learning processes and organizational change. Most of the literature on economic learning processes focuses on organizational learning, with a goal of understanding how firms, industry clusters, regions, and nations are able to adjust to rapidly changing economic conditions, and develop innovative new products and processes. Human learning processes, and particularly the processes through which meaning, identity, and social interactions shape learning, remain a ‘black box’ in most of these studies.” (Benner 2003, p.1812)

One author who have become one of the key author in the “economic approach”, Peter Maskell, is criticized directly by (Benner 2003), and in doing so (Benner 2003) also aims a broadside against the cluster literature dealing with the notions of “in the air”, culture, information-exchange, proximity etc:

For example, in their comparison of the Danish and Finnish furniture industries, Maskell et al (1998) argue that the success of the Danish furniture industry is based on “interactive technological and organizational learning processes” (page 118) that have helped Danish firms effectively recognize and respond to changing consumer product demand while improving organizational efficiency. They are unable, however, to provide insights into the nature of those interactions, arguing simply that they are rooted in common culture, spatial proximity, and repeated long-term information exchanges which are ‘in the air’ for locally rooted firms, but impossible for outside competitors to “understand, codify, capture, and imitate” (page 111)...

...Thus, research on ‘learning regions’ has effectively argued that human identity formation, convention creation, and cultural assets are intimately connected with shaping regional eco-

conomic dynamics, but are only beginning to understand how processes of human learning and organizational learning are related. To truly understand the nature of such connections requires detailed ethnographic research that can start from understanding human learning processes, examining how these processes are shaped by, and in turn shape, organizational structure” (Benner 2003, p.1812)

The important point made by (Benner 2003) here is that he stresses the lack of theoretical conceptualization and empirical investigation at the micro level. The micro processes, the interactions among people on the level of the person, the construction of identities, and the learning processes are lacking in the literature.

This is also a weakness which runs through both the “economic approach” and well as the “historical approach”. While it may be most clear in the contributions in the “economic approaches” it also haunts the “historical approach”. Take for example the widespread notion of absorptive capacity developed originally by (Cohen & Levinthal 1990), which has also found its way into the cluster literature in relation to the discussion of knowledge spillovers, see for example (Giuliani 2006; Giuliani & Bell 2005). If we focus at the micro level, the use of this concept implies conceptualizing humans as some kind of sponges in relation to information; if a person already has received some information, then he or she can absorb more of similar knowledge, a logic which is rather useless at the level of persons, but nevertheless widely used in the literature, as (Brown & Duguid 2000b) points out:

“Literature about workplace learning is still laced with ideas of “absorptive capacity,” as if humans were information sponges. Indeed, the idea that learning is mere information absorption may be on the rise today because it allows for more redefinition. If we accept this view of learning, then it’s a short step to talking about such things as computers or bots learning, as if what they do is just what people do. Looking beyond information, as we have tried to do, provides a richer picture of learning.” (Brown & Duguid 2000b, p.135)

The cluster literature therefore stands today, as a diverse literature in which a number of different theories and concepts are in play, but these are combined rather eclectically, often in “universal explanations of cluster”, which means that they are also used relatively superficially. Contributions rarely go into details with the theoretical basis for the concepts used, and their compatibility or lack of the same, and the micro level is often neither conceptualized theoretically nor investigated empirically. And this situation has not improved over the years. In a recent critique of the cluster literature (Taylor 2010) thus argued:

“... The purpose of this paper is to bring together this emerging body of criticism of clustering. The suggestion here is that the cluster model has been built through the accretion of layer upon layer of contingency generated through the interpretation, re-interpretation, conjecture and extrapolation of stylized facts buttressed by weak empiricism. As a consequence, the result edifice is significantly weakened by a combination of over-elaboration and omission.” (Taylor 2010)

(Taylor 2010) presents 7 weaknesses of the literature as it stands today, and these are:

1. “Neglect of the imperatives of capitalism – issues of profits, prices and people;
2. underestimation of the unequal power relations on business relationships;
3. failure to incorporate the exigencies of time;
4. fetishising of proximity;
5. simplistic treatment of processes of entrepreneurship;

6. promotion of the chaotic concept of 'institutional thickness'; and
7. limitation by the equally chaotic concept of 'social capital'."

(Taylor 2010, p.278)

Having discussed these in details, (Taylor 2010) makes the argument, that to move forward it is necessary to place emphasis upon "... the actions, motives, and interconnections of people in places aiming to secure a livelihood and living within a capitalistic system" (Taylor 2010, p.283). In other words, (Taylor 2010), also makes the argument, that (Benner 2003) puts forward, that focus has to be placed on the micro level in future cluster studies.

The conclusion to draw from this discussion of the weaknesses in the cluster literature is that it is necessary to avoid the idea of forming universal explanations of why clusters emerge and how they function, using theoretically frameworks which eclectically combines many different theories. Instead one needs to turn towards the micro level, and rigorously conceptualize theoretically and investigate empirically the dynamics occurring between people within what is referred to as clusters, i.e. the processes shaping the identities of these persons' identities, their learning, and their behaviour in general.

In the previous section I presented an overview of the literature of clusters. Having now looked at the weaknesses of this literature the conclusion to make must be that given the objective of this thesis, the way to proceed is to focus on how acquisitions by MNCs influence the dynamics on the micro level within clusters.

When looking at contributions in both the "historical approach" as well as the "empirical approach" a picture emerges, and this is that dynamics related to learning and knowledge, under different theoretical conceptualizations, using different concepts, for example localized learning, tacit knowledge, knowledge spillover, absorptive capacity, shared institutions etc., or combinations of these, occupies central stage in the contributions. In other words, the main focus in the literature in recent years has been on learning and knowledge processes within clusters.

Therefore it must be concluded, that to investigate how acquisitions of local companies within cluster change such organizations and the dynamics within the clusters, then focus must be placed analytically on processes related to learning and knowledge. And focus must further, given the previous discussion about weaknesses in the cluster literature, be placed on a micro level here. Let us therefore turn to how to conceptualize learning at a micro level within clusters.

2.2 Learning at the micro level

As I explained earlier, both contributions in the "historical approach" and the "economic approach" build on a number of concepts and theories related to learning. And some contributions do indeed use theories about learning and knowledge which can be used to conceptualize the micro level theoretically, and thus also form the basis for empirical investigations of this level. Two theories stand out in this regard.

One is the theory on tacit and explicit knowledge originally developed by (Polanyi 1967) and made influential in organizational studies through the works of Nonaka in particular, see for example (Nonaka, Toyama, & Konno 2001; Nonaka 1994), and has been used widely in the cluster literature. The other theory which has been less used in cluster studies, is the theory of communities of practice developed by (Wenger 1998).

To illustrate the strengths of these two approaches, I will discuss shortly in the following sections how these two theories frame learning and knowledge, and thereafter why the choice fell on Wenger's theory as the starting point for the case study in this thesis.

2.2.1 Knowledge creation according to Nonaka

According to (Nonaka, Toyama, & Konno 2001) two types of knowledge exist, tacit knowledge and explicit knowledge, and three elements are fundamental to the process in which knowledge is created: The SECI process, Ba and knowledge assets. The SECI process is a model that describes how knowledge is created, ba is the context for the process, and knowledge assets both the input and the output of the process.

According to (Nonaka, Toyama, & Konno 2001) knowledge is developed in the dynamic process that takes place when knowledge is converted between different states, and four conversion types exists: Socialization, Externalization, Combination and Internalization. In the socialization process tacit knowledge is converted into new forms of tacit knowledge through social interaction. In the externalization process tacit knowledge is converted into explicit knowledge through the development of metaphors, analogies and models. In the combination process explicit knowledge is converted into more complicated and systematic sets of explicit knowledge. In the internalization process explicit knowledge is converted into tacit knowledge. This process is related to learning by doing, people internalize explicit knowledge through actions and thereby produce tacit knowledge (Nonaka, Toyama, & Konno 2001). The point is that the four types of knowledge development form a spiral so that knowledge grows during the conversions described (Nonaka, Toyama, & Konno 2001).

Ba is defined as the shared context in which knowledge is shared, created and utilized (Nonaka, Toyama, & Konno 2001). Knowledge is conceptualized as a social construction that is context dependent, and therefore this context becomes important. The key concept to understanding ba is interaction according to (Nonaka, Toyama, & Konno 2001), quotation:

"Knowledge is created by means of the interaction among individuals or between individuals and their environment, rather than by an individual operating alone. *Ba* is the context shared by those who interact with each other and, via such interactions, those who participate in *ba* and the context itself evolve through self-transcendence to create knowledge..." (Nonaka, Toyama, & Konno 2001, p.22 Original italics)

Ba is in other words the context, the place, in which information is interpreted to become knowledge (Nonaka, Toyama, & Konno 2001). Four different kinds of ba exist: Originating ba, Dialoguing ba, Systemizing ba and exercising ba. The point is that each ba is the specific context for one of the conversion processes described in the SECI model. Originating ba is for example individual face-to-face interactions which is the context for the socialization process (Nonaka, Toyama, & Konno 2001). Knowledge assets are the basis for the knowledge development process, and again for each conversion process in the SECI model different assets are used: Experimental knowledge assets, Conceptual knowledge assets, Systemic knowledge assets and Routine knowledge assets.

This constitutes the core in the theory on knowledge creating according to (Nonaka, Toyama, & Konno 2001), and after I have presented the core in the theory of communities of practice, I will return to how this theory.

2.2.2 Communities of practice

The basis for the community of practice theory is to be found in the work of (Lave & Wenger 1991) on situated learning, but the father of the theory on communities of practice must be regarded as Etienne Wenger, and the main contribution is (Wenger 1998). The concept of communities of practice has had a large impact on studies dealing with learning, and of notable authors using this approach John Seely Brown and Paul Duguid can be mentioned, who have explored learning in an organizational perspective using the concept of communities of practice in several publications (Brown & Duguid 1991; Brown & Duguid 2000b; Brown & Duguid 2001).

According to (Wenger 1998) a community of practice is a community of people characterized by three dimensions: A mutual engagement, a joint enterprise and a shared repertoire. To understand how a community of practice develops new knowledge and which factors that affect this process we can distinguish between core processes and boundary processes in communities of practice.

The process that takes place at the core of a community of practice is the negotiation of meaning. As the members of the community negotiated meaning, the three dimensions of the community expand. The mutual engagement develops for example when persons learn how they best can organize themselves around the task at hand, who is good at what, who is bad at what etc. (Wenger 2004) The joint enterprise develops as the persons negotiate how they do their tasks, how they can improve their methods, what they should do and what they should not do etc. (Wenger 2004). The shared repertoire also develops, the persons develop new ways of viewing their task, new concepts etc. (Wenger 2004) Together these processes can be seen as a learning process in which each member of the community and the community as a whole develop, whereby new knowledge is created.

In this core process the knowledge embedded in the members of the community is thus exposed and through the negotiation of meaning transformed into new forms, new knowledge. This is illustrated for example in (Brown & Duguid 1991) where it is described how storytelling in a community of practice leads to growth among the three dimensions in a community of copier repair men. The point is that storytelling can be seen as a conversion process in which the old stories are transformed into new ones. In other words, the knowledge residing in the community of practice is transformed and developed. The fact that the core process builds on knowledge embedded in the persons constituting the communities make the boundary processes in a community of practice important, because it is through these the members of the communities receive knowledge from the surrounding world, and thereby the raw material for the core processes.

The three dimensions which make it possible for communities of practice to develop knowledge are also the dimensions which make it difficult for persons in the community to share knowledge with people from outside the community. The communication problem relates to all the three dimensions of the community of practice, outsiders may not understand the joint enterprise, not know how to participate in the mutual engagement and not know the shared repertoire. In other words, people from the outside do not have the practice of the community (Wenger 2004). The boundary between members and outsiders are not absolute, people may share parts of the practice, and this can make it possible to diffuse knowledge in networks where people are not all part of the same community of practice. For example, knowledge can be

spread in professional communities worldwide, because of a shared practice in these communities, even though members of such communities do not interact and form a community of practice, as described by (Wenger 2004). This can instead be understood as networks of practice. People in a network of practice are significantly more loosely related to each other than people in a community of practice, but because they share a practice, they are able to share knowledge with each other (Brown & Duguid 2001).

The point is, that new knowledge is developed in the negotiation of meaning that takes place in the core of a community of practice, but the raw material that enables this process is the knowledge the community of practice receives through boundary processes from other communities through networks of practice. Without this supply of new knowledge from the outside, the knowledge embedded in the persons constituting a community of practice will eventually all be revealed, and learning, and thereby knowledge creation will stop (Wenger 2003).

According to (Wenger 2004) knowledge is spread between communities of practice through mediators, people who are member of different communities, boundary objects and boundary meetings, for example meetings between people from different communities. Objects can only reflect a practice and can therefore be interpreted in multiple ways. Therefore it can be difficult to diffuse practice in objects. People, however, take active part in the negotiation of meaning, and this is the strength of knowledge diffusion using boundary meeting and mediators. I will later elaborate on the boundary processes, but having now presented the core in the two theories on learning, it is time to return to the applications of these theories in the cluster literature.

2.2.3 The micro level in cluster analysis

The theory on tacit and explicit knowledge has been widely used in the literature on clusters and regional development, see for example (Bathelt & Gluckler 2005; Breschi & Lissoni 2001b; Broekel & Binder 2007; Cowan, David, & Foray 2000; Faulconbridge 2005; Faulconbridge 2006; Gertler 2003; Johnson, Lorenz, & Lundvall 2002; Lawson & Lorenz 1999). The theory on communities of practice only to a more limited degree, see for example (Benner 2003; Brown & Duguid 2000a).

The strength of both approaches is, that they frame learning as a situated practice, as something which is done by people in specific places and situations. This makes these approaches useful as a basis for empirical studies of learning processes in organizations, which is no doubt also the reason for their success in the literature on learning.

As can be seen from the previous sections the two approaches to learning have some similar characteristics. One common ground between the theories is the conversion process in which existing knowledge is converted into new knowledge. This process is described in both theories, in the discussion about conversions of knowledge in SECI process and in the discussion about negotiation of meaning in communities of practice. Another common ground between the theories is that the context is fundamental to the process in which knowledge is created. In the theory presented by (Wenger 2004) the context for development of new knowledge is the community of practice. In the theory presented by (Nonaka, Toyama, & Konno 2001) the context for development of new knowledge is ba. According to (Nonaka, Toyama, & Konno 2001) a community of practice is not a context in which new knowledge is created but a context in which the members of the community learns the knowledge already embedded in the community. On the contrary, the SECI process which takes place in a ba is a process in which new knowledge is created according to (Nonaka, Toyama, & Konno 2001). To understand the difference between the

two theories it is therefore necessary to focus on the difference between a community of practice and a *ba*. (Nonaka, Toyama, & Konno 2001) describes this difference as:

“The boundary of a community of practice is firmly set by the task, culture and history of the community. Consistency and continuity are important for a community of practice, because it needs an identity. In contrast, the boundary of a *ba* is fluid and can be changed quickly as it is set by the participants. Instead of being constrained by history, *ba* has a ‘here and now’ quality as an emerging relationship. It is constantly moving; it is created, functions and disappears according to need. *Ba* constantly changes, as the contexts of participants and/or the membership of *ba* change. In a community of practice, changes takes place mainly at the micro (individual) level, as new participants learn to be full participants. In *ba*, changes take place at both the micro and the macro levels, as participants change both themselves and *ba* itself. While the membership of a community of practice is fairly stable and it takes time for a new participant, the membership of *ba* is not fixed – participants come and go. Whereas members of a community of practice belong to the community, participants of *ba* relate to the *ba*.” (Nonaka, Toyama, & Konno 2001, p.24 Original italics)

The reason why (Nonaka, Toyama, & Konno 2001) focuses on *ba* is that people has to participate in a shared context to create knowledge. The main question which divides (Nonaka, Toyama, & Konno 2001) and (Wenger 2004) is therefore: what amount of shared context is necessary to develop new knowledge? As shown in the quotation above (Nonaka, Toyama, & Konno 2001) does not see a need for a group of people to have a shared history, in the form of a joint enterprise, mutual engagement, shared repertoire developed through time as described by (Wenger 2004) to develop new knowledge. According to (Nonaka, Toyama, & Konno 2001) people just have to share time and space, they have to interact. This means that a *ba* can be something different from a community of practice, because *ba* is more loosely defined than a community of practice. *Ba* does not need the stability over time that a community of practice demands, nevertheless a community of practice can also be seen as a *ba*, because people interact in time and space. *Ba* can emerge and disappear suddenly.

We can look at an example to illustrate this difference. We can imagine a R&D team in a company made up of engineers, designers, architects, marketing people etc., people with different backgrounds and knowledge. Using the theory created by (Nonaka, Toyama, & Konno 2001) it is possible to argue that these people can interact in time and space, form a *ba*, and therefore be able to develop new knowledge through the conversion process described in the SECI model. However, we could also argue using the theory created by (Wenger 2004), that these people will maybe find it hard to develop new knowledge because they do not share a practice. The decisive question is: how much shared practice or shared context do people need to develop new knowledge? Using the two theories it is not possible to answer this question, but it is clear that this is a place where the two approaches diverge.

A third common ground is that the basis for development of new knowledge is existing knowledge. According to (Wenger 2004) knowledge is spread between communities of practice through mediators, people who are member of different communities, boundary objects and boundary meetings, for example meetings between people from different communities. Knowledge is not spread freely between communities of practice through these mechanisms, and the possibility of spreading knowledge between two communities of practice depends on the practice in the two communities of practice (Wenger 2004). If the practice is too different people from the two communities will not understand each other and no knowledge can be spread. Nonetheless, if the practice is too similar, knowledge can be spread, but the process will not have huge consequences regarding the development of new knowledge in the communities because

the knowledge they gain is already relatively well-known. This means that if the practice is too different, no knowledge can be spread, if it is too similar there is no point in spreading knowledge. In other words, a shared practice is a condition for knowledge to be spread. (Brown & Duguid 2000b) elaborates on this argument by creating the concept of networks of practice (NOPs). Their point is that while communities of practice are characterized by the mutual engagement between people, there are also networks of people who share practices and therefore are capable of exchanging knowledge although they do not interact personally:

“First, there are the networks that link people to others whom they may never get to know but who works on similar practices. We call these “networks of practice”. Second, there are the more tight-knit groups formed, again through practice, by people working together on the same or similar tasks. These are what, following Lave and Wenger, we call “communities of practice.” “ (Brown & Duguid 2000b, p.141)

According to (Nonaka, Toyama, & Konno 2001), knowledge is as argued earlier spread and developed in the SECI process, when it is converted between different states. Therefore also in this theory the basis for the development of new knowledge is existing knowledge.

So although the theories share certain characteristics in their description of the processes relating to learning and knowledge, they have been used in rather different ways in the cluster literature. To illuminate this, we can start by looking at the use of the theory on tacit and explicit knowledge.

The use of the distinction between tacit and explicit knowledge has become a classical argument in the cluster literature. The argument has been, both in the “historical approach” camp as well as in the “economic approach” camp that the proximity within clusters, or districts or regions, has made it easier for tacit knowledge to be diffused between firms inside cluster than between firms outside clusters, giving firms in clusters an advantage compared to firms outside. Although widespread, this argument has also been the objective of a heated debate. It was mentioned earlier, that (Martin & Sunley 2003) called the use of this argument an “unsubstantiated and obscure proposition”. Proponents of the concept often argued that the nearness do indeed increase the likelihood of sharing tacit knowledge due to the presence of similar institutions and cultures, due to proximity (Malmberg & Maskell 2006). The problem is that the arguments in favour of the proposition often seem superficial. (Malmberg & Maskell 2006), who from their position in the “economic approach” themselves clearly take a stand in favour of the concept of tacit and explicit knowledge, and in relation to the criticism of the concept of localized learning build on Wenger’s work, they argue the following in relation to critics of the concept of “localized learning”:

“The third type of criticism is of a conjectural nature, based on the idea that dense interacting populations of various kinds of individuals can emerge within a certain trade or profession (Amin and Cohendet 2004; Brown and Duguid 1991; Cetina 1999; Wenger 1998; Wenger and Snyder 2000). Permanent or temporary communities of practice⁷ or epistemic communities may develop relations of trust and shared cognitions that augment interactive learning and alleviate the friction of exchanging even tacit knowledge, despite being globally dispersed. This line of thinking has also found its way into the field of urban research, where cities are now sometimes situated in the discourse of “distanciated economic flows and networks” (Amin and Thrift 2002).” (Malmberg & Maskell 2006, p.9)

To this they argue the following:

“There are two issues at stake here, and substantial misunderstanding seems to prevail in both cases, when it comes to what the localized learning argument amounts to. The first issue is whether spatial proximity has an impact on processes of interactive learning. The localized learning argument is that spatial proximity will tend to strengthen cognitive proximity by developing a common institutional, social, and cultural setting. Learning is enhanced because proximity brings interacting parties together not only in space but also in perception. In addition, localized learning may involve spillover effects that work their way through more or less automatic processes of observation, monitoring, benchmarking, and informal information exchange such as buzz. Despite Boschma’s (2005) critical stance, his conclusion that spatial proximity will tend to reinforce other forms of proximities is actually in support of the existence of localization effects in processes of learning and innovation. Exactly how important the effects are can of course be debated, but not the mechanism as such.

The second issue has to do with whether and how a local milieu should be linked to its wider—ultimately global—surrounding. For some reason, the localized learning argument has sometimes been read as if a region—or a cluster—could, or even should, be selfsufficient in knowledge terms, and that the learning or innovation outcome would be greater, the more local interactions dominate over extra-local links. This is a plain misunderstanding: Neither the argument of localized processes of interactive learning nor the existence of localized capabilities does in any way presuppose that most interaction should be local, that it is better with more local than global interaction, or that the most important capabilities are geared toward local interaction.” (Malmberg & Maskell 2006, p.9)

This is a long quote, but it is important, because it exemplifies the situation in parts of the current cluster literature, which is that focus is placed on the macro level, and relatively superficial theoretical arguments leaving out empirical investigations of the issues. Instead of going into detail with the theory on communities of practice (Malmberg & Maskell 2006) simply argue, that learning in clusters are enhanced, compared to learning occurring over distance, because the nearness brings the people interacting closer in “perception”, when they argue; quote “Learning is enhanced because proximity brings interacting parties together not only in space but also in perception” (Malmberg & Maskell 2006, p.9). The problem is that they present this argument without arguing theoretically why this is the case. And they do not present any empirical evidence to back up this claim either. They argue that due to “spillover effects that work their way through more or less automatic processes of observation, monitoring, benchmarking, and informal information exchange such as buzz” (Malmberg & Maskell 2006, p.9) the learning is enhanced, without even linking this discussion to the COP theory. They do not go into detail with the COP theory or argue theoretically why the contributions using this approach are wrong. They simply state this is the way it is, and that this mechanism cannot be discussed.

When we recall, that Wenger argues, that knowledge can indeed be spread globally through communities of practice, and Nonaka argues, as we saw earlier, that the conversion and thus exchange and development of knowledge only demands a ba, which makes even fewer demands to the presence of shared history among persons in his theory, compared to the demands for shared history in Wenger’s theory, then it must be concluded, that the argument made by (Malmberg & Maskell 2006) does indeed seem unsubstantiated and obscure. To mention two other contributions pointing in the same direction we can look at (Faulconbridge 2005) and (Faulconbridge 2006), which also questions the simple association between tacit knowledge and geographical proximity.

This discussion of tacit and explicit knowledge and geographical proximity emerged today as a diffused debate in the cluster literature with many theoretical arguments for and against, as well

as a striking lack of empirical investigations. It thus exemplifies well the weaknesses in the cluster literature discussed earlier, that it rests on an eclectically theoretical basis, and superficial use of theoretical concepts.

The theory developed by Nonaka is not about two types of knowledge, with different characteristics, of which one type only can be transferred locally. It is a theory about how learning occurs and knowledge is developed as it is converted between different states in different contexts. But it seems that the concept has merely been picked up by cluster researchers, and has been easy to fit into some overall cluster explanations if some important theoretical aspects are left out.

Turning to the other theory on learning, Wenger's COP theory, it emerges that this has also been used in the cluster literature. In some circumstances as an argument against localized learning, but also, in one very important contribution as an explanation of why learning and knowledge diffusion is indeed stimulated in a cluster context. And this contribution is (Brown & Duguid 2000a)

(Brown & Duguid 2000a)'s argument is, shortly explained, that the weakness of COPs is that the shared practice within these, which enables knowledge to be shared among members, is also what makes knowledge diffusion among COPs difficult due to the lack of shared practice between COPs:

"The strength of these groups is simultaneously their weakness. Shared practice makes it easy to circulate new ideas within such groups. But the absence of shared practice beyond a group's boundaries can make it difficult to get these ideas out of the community." (Brown & Duguid 2000a, no page number)

This is why knowledge within firms is often "sticky" according to (Brown & Duguid 2000a). Their argument is that different COPs within firms often have relatively different practices, making diffusion of knowledge between these COPs difficult, for example between R&D and management. Between firms knowledge is often "leaky" on the other hand, because different firms within the same industry or cluster often contain COPs with similar practice. As an example we can think of two competing high-tech companies within the same industry, COPs in these two companies focused on R&D work on similar products may have practices which are rather similar, whereas there might be a rather large difference between practices in the R&D focused COPs within one firm and, say, marketing oriented COPs within the same firm. (Brown & Duguid 2000a) describe this the following way:

"These sorts of networks are very much in the air in Silicon Valley, where researchers, programmers, engineers, and managers from all the different firms regularly rub shoulders with their counterparts in rival firms.

We think of these networks as "networks of practice" to suggest that they are related to, but distinct from communities of practice. Networks of practice are made up of people that engage in the same or very similar practice, but unlike in a community of practice, these people don't necessarily work together. So, for example, there is a network of hematologists that runs across hospitals, research labs, and medical schools. All members of the network have a lot in common by virtue of the work they do." (Brown & Duguid 2000a, no page number)

Their argument is therefore that a cluster's localization thus enhances the possibilities of learning in companies because of this leakiness between firms. What makes this conceptualization interesting is the notion of knowledge which is able to flow between COPs in different firms in clusters.

It can be discussed whether (Brown & Duguid 2000a) are to be located in the “historical approach” or in the “economic approach”. On the one hand, they do present a theoretical explanation for why firms in cluster have an advantage compared to firms outside in relation to learning. On the other hand, they do so using a theory which is clearly social in the form, based on the community of practice theory. And further, they use only this theory and go into detail with it. They do not present an elaborate universal explanation of why clusters exist, putting different theories together eclectically; they simply explain theoretically, using one theory, how a cluster location can support learning and knowledge diffusion between companies. Further, they thus also present an argument which can be tested empirically, given the conceptualization of the dynamics characterizing COPs and networks of practice.

In other words, (Brown & Duguid 2000a) constitute a step in an important direction which can bring cluster research past its current criticisable state, because it satisfies the four demands raised in the critique of the cluster literature, as discussed above. (Brown & Duguid 2000a) do not try to present a universal model; they only focus on one dynamics, i.e. learning in clusters. They refer to other theories on clusters and learning in the paper, but they do not use an eclectically theoretical basis in their argument, but only the COP theory. By doing so they place focus at the micro level, and it thus becomes possible to conceptualize theoretically and investigate empirically the micro dynamics occurring at the micro level between persons in COPs within organizations in clusters. It also becomes possible to conceptualise theoretically and analyse empirically these organizations as constellations of COPs, as well as it becomes possible to conceptualize theoretically and analyse empirically the knowledge diffusion between organizations given the focus on boundary processes in the COP theory. Furthermore, by choosing this particular approach I avoid placing this thesis at the centre of the heated debate for and against tacit knowledge, which would have caused trouble in conceptualizing learning in cluster given the many different and often opposing arguments in relation to tacit knowledge.

Given the focus on learning and knowledge in explanations of clusters, and the critiques of the cluster literature, as well as the discussion of the two perspectives on knowledge, I therefore concluded that it was necessary to investigate how acquisitions of companies in clusters by MNCs changes learning processes within these organizations and within the clusters in focus, using the theory about communities of practice to conceptualize learning, and as a basis for an empirical investigation of this.

I decided, as explained earlier to use the case study methodology to investigate this question, and chapter 5 will present the rationalities for choosing this methodology and how it was used. The case study showed, as also argued earlier, that a Foucauldian analytical approach was more suited. This meant changing the focus from learning to the discourses and events shaping the persons within the case company, and the construction of the case cluster. The analytical focus on learning was hence left, and replaced by a focus on power, discourses and events. Chapter 3 will present the Foucauldian approach, but before turning to this, it is in its place to reflect on how the new Foucauldian approach places this thesis in relation to the cluster literature as well as in relation to the literature on MNCs.

2.3 Power in cluster analysis

The Foucauldian approach is as chapter 3 will show an approach building on a focus on power. Power has been a neglected issue in relation to cluster research, as argued by (Taylor 2010).

According to (Taylor 2010) there has been an implicit assumption underpinning the cluster literature, which is that relations between actors within clusters are benign in nature. And this is a problem, since there, according to (Taylor 2010) is increasing evidence that this is far from the case in all cluster, on the contrary, it may be the direct opposite of the reality in clusters. The lack of focus on power is according to (Taylor 2010) especially clear in the parts of the cluster literature dealing with localized regions.

The only publications I have been able to locate, which develops a power based conceptualization of clusters is (Bathelt & Taylor 2002). They argued that, quote:

“... a deeper appreciation of the nature of the power relationships between firms and the circuits of power that bind them together is key to understanding how clusters function – including how they might emerge and how they might decline” (Bathelt & Taylor 2002, p.93)

(Bathelt & Taylor 2002) draw on a number of different approaches to power, and the problem with this is, that they, inspired by (Clegg 1989) and others, try to merge different approaches to power into one framework, which causes some problems at the basic conceptual level. One serious problem is, for example, that they merge the ideas of Foucault with the idea that power can be understood as something possessed. This is a weakness, since Foucault emphasize several times in his work that power, by its very nature, is not something which is possessed and located somewhere in society, as I will elaborate on in chapter 3. In other words, the eclectic approach haunting the cluster literature in general does indeed also haunt (Bathelt & Taylor 2002).

If we abandon such attempts to unify the power literature, and instead look into the works of Foucault, I believe that we here find an important collection of ideas, which can help us advance the cluster literature, and do so in a theoretically cohesive way. Through his work, Foucault has dealt explicitly with the relationship between knowledge and power, and the constructions of subjects and concepts such as madness or sexuality in society. I will show with this thesis, that these approaches can also be used to understand how people with specific identities and behaviours are constructed in clusters, and further how specific organizations emerge within these, and how clusters themselves are indeed social constructions, which change over time. This also places my research in the same category as a relatively new strand of literature on MNCs in which it is argued, that these have to be analyzed as social constructions, and that focus has to be placed on the processes shaping the identity and the behaviour of people at the micro level.

2.4 Power and MNCs

Traditionally in literature on MNCs power was understood as being distributed along the hierarchical lines of the organization. HQ was the central authority, and HQ therefore made all strategic decisions, and subsidiaries followed these decisions, and were therefore primarily responsible for operational tasks. The task for HQ management was to create strategies taking into account needs and resources of each subsidiary (Dörrenbächer & Geppert 2006). This view of MNCs, as being “cohesive, goal-directed rational actors”, is still used in managerial and economic perspective as well as in some streams within the international business literature (Morgan 2001).

By 2001 three broad streams of literature dealing with MNCs existed according to (Morgan 2001). The first dealt with how MNCs make choices about how to expand their operations, i.e. should it be through joint ventures, mergers or acquisitions, which approach fits what cases etc. The second stream of literature dealt with different stages of internationalization of MNCs, i.e. do MNCs go through a certain sequence of stages in their internationalization process or can they jump stages etc. The third stream dealt with how MNCs are managed, i.e. issues of integra-

tion vs. autonomy of subsidiaries etc. (Morgan 2001). Binding these streams of literature together was, according to (Morgan 2001, p.8), certain shared assumptions about “academic knowledge, social reality, and models of the world”.

Firstly, the three streams of literature build on an economic perspective of models, which is that modelling begins with a market and rational actors pursuing their interests on the basis of cost calculations, and the allocation of resources occurs through the ‘invisible hand’ of the market. The construction of models for firms are simply examples of models that are scaled up, and made increasingly complex by the addition of variables, but the fundamental dynamics are simple, relating to rational actors pursuing profits (Morgan 2001). Secondly, empirical data occupies a secondary place in the literature, which means that model construction is the primary objective, and although empirical data might be useful to test models or stimulating further model building, empirical data cannot change the underlying assumptions about rationality etc. (Morgan 2001). Finally, the goal on a management level of these three streams of literature is to identify structures and processes which can maximize profits. Again, the underlying idea is that economic life is seen as a rational process, where rational actors makes choices on the basis of cost considerations and the activities they want to undertake (Morgan 2001). Given that the three streams of MNCs literature share these assumptions, they are not capable of addressing the social political underpinnings of MNCs, as (Morgan 2001) argues:

“Model-building and the development of theory from these presuppositions have little to say about the social embeddedness of rationality and the contingent and precarious nature of organizational order. It is therefore unable to address systematically the social determinants of organizational structures, the political nature of decision-making, the irrationality of organizations, and the social construction of markets.” (Morgan 2001, p.9)

This classical view on power within MNCs started to change after the contribution by (Barlett & Ghoshal 1989). The issue facing MNCs was according to (Barlett & Ghoshal 1989) the problem of global integration vs. local responsiveness. Global integration and global brands could reduce costs, whereas national cultures, regulations etc., could make products tailored for local circumstances needed. It should be noted, that the contribution of (Barlett & Ghoshal 1989) is located in the third stream of MNC literature dealing with MNC management, as defined by (Morgan 2001). After (Barlett & Ghoshal 1989) the power of HQ was questioned, and the power of HQ was understood as being limited (Dörrenbächer & Geppert 2006). Power thus became perceived as being more decentralized and the impacts of changing markets and technologies as well as cultural differences were now also taken into consideration. This led to the idea of understanding the transnational company as a differentiated network, which is:

“... composed of distributed resources linked through different types of relations: (1) the “local” linkages within each subsidiary; (2) the linkages between headquarters and the subsidiaries; and (3) the linkages between subsidiaries themselves” (Nohria & Ghoshal 1997, p.7)

Recently, the focus upon micro-politics in MNCs has been intensified, and this has led to the emergence of a new stream of literature which focuses explicitly of the social underpinnings of MNCs.

According to this literature MNCs should be understood as social constructions, rather than homogenous rational social actor. They are constituted by numerous different actors pursuing different goals, and given that MNCs span different national contexts, the processes occurring inside MNCs are different from processes occurring in non-international firms (Morgan 2001). The basic economic assumptions about rational actor pursuing profits etc. are therefore abandoned in this stream of literature. The question is rather how actors, and their goals are constructed, as (Dörrenbächer & Geppert 2006, p.254-255) argued, in their editorial in 2006, quote: “The focus

on micro-politics in MNCs is first and foremost about bringing back the actors and examining the conflicts that emerges when powerful actors with different goals, interests and identities interact with each other locally and across national and functional borders" (Dörrenbächer & Geppert 2006, p.254-255).

(Dörrenbächer & Geppert 2006) further argued for a move away from approaches founded in contingency theory, and the tendency observable in much MNC literature where actors remain 'faceless', and simple understood as being part of HQs or part of subsidiaries and as such characterized by what (Dörrenbächer & Geppert 2006) calls "universal" behavioural assumptions, for example "not invented here" attitudes or "knowledge sharing hostility". Leaving these approaches (Dörrenbächer & Geppert 2006) argued that researchers of MNCs should conduct true studies of micro-politics in organizations, where, quote:

"... genuine micro-political approaches do not see individual or corporate actors as merely executive organs of external institutional and task environment features. Instead, they conceptualize actors as being informed by structural and institutional constraints but at the same time taking into account their subjective interests in organizing and strategizing. Very often those interests are self-centered, defined genuinely by issues of gaining power and autonomy, and by career ambitions within in a certain subsidiary or within the MNC as a whole. However, they might also be shaped by altruistic ideas and beliefs (Ortmann, 1988), personal identity construction (Weick, 1995) or group dynamics (Lee and Lawrence, 1995)." (Dörrenbächer & Geppert 2006, p256)

We should thus investigate, in other words, the micro-political processes through which actors within MNC HQs and subsidiaries are constructed, if we are to understand how and why these change over time. How can such a study be done? What is a micro-political analysis of an MNC organization? (Dörrenbächer & Geppert 2006, p.256) describes micro-politics in an organization context in the following way, quote:

"Like all other forms of politics, organizational micro-politics are understood as an attempt to exert a formative influence on social structures and human relations. Securing options, realizing interests, and achieving success however take place in a contested terrain. Thus micro-political conflicts are everyday occurrences which can appear in every organization, including in MNCs. Moreover, these conflicts are a fundamental mechanism of social interactions which either can hold organizations together or lead to fragmentation and disintegration. Micro-politics can affect a MNC as a whole, for example, when they concern global business strategy. However, they also apply to medium range issues, such as when decisions are about the location of economic activity or the re-grading of subsidiary functions and mandates. Finally, micro-political conflicts occur at the departmental level in either the HQ or the subsidiaries, for instance over the development of external (international) contacts or the negotiation of budgetary issues." (Dörrenbächer & Geppert 2006, p.256)

Politics in an organizational context is thus about power, but what kind of power? How should power be conceptualized in an organizational context? This question is key if we are to analyze the MNCs and their subsidiaries, because our analytical approach depends on how we conceive power.

It seems to me that a socio-political study is not only a study of power in an organizational context; it is rather a study of power as well as a study of how people within organizations are constructed, given the quotes above. Therefore I will argue that a Foucauldian approach to the study of MNCs is a well suited approach in this context, because Foucault's goal was not to analyze power for the sake of power, rather he developed analytical frameworks, which can be used to analyze how people are constructed as subjects through a study of force relations in society. And this is exactly the goal according to (Dörrenbächer & Geppert 2006); we have to analyze how

people within MNCs are constructed, if we are to understand MNCs, as argued in the quote above. And this also means how people in MNC subsidiaries are constructed. Therefore, let us now turn to my use of the Foucauldian approach.

Part II: An Foucauldian approach

Chapter 3: Foucault's works

"I would like to write the history of this prison, with all the political investments of the body that it gathers together in its architecture. Why? Simply because I am interested in the past? No, if one means by that writing a history of the past in terms of the present. Yes, if one means writing the history of the present." (Foucault 1991, p.30-31)

How can Foucault's ideas be operationalized into a tool capable of illuminating the construction of subjects within organizations within clusters? What does a Foucauldian approach capture, that a Wengerian doesn't? What kind of science does this thesis constitute? What are the rationales for the structure of this thesis? These are the questions I will address in this second part of the thesis.

The analytical framework which I will develop in this thesis, for investigating how people within local companies in clusters which become acquired by MNCs, are constructed as subjects, and how the clusters of which they are part are constructed as clusters, will rest on the work of Michael Foucault and Bent Flyvbjerg. Foucault made analytical frameworks which make it possible to analyze how people are constructed as subjects within society. (Flyvbjerg 2001) took his point of departure in Foucault, Aristotle's and others, and developed what he terms a phronetic approach to social science, which is based on the issue of values, and how to act within society. To describe the difference between Flyvbjerg and Foucault shortly, one can say, that Foucault developed analytical approaches to analyze how we have gotten to where we are; he wrote "the history of the present", as he famously proclaimed in the quote from "Discipline and Punish" above. Flyvbjerg used the methods developed by Foucault, as part of the basis for not only analyzing where we have come to, but also whether this is desirable, and if not, what should be done about it. Flyvbjerg thereby operationalized Foucault's work, and took it two steps further, where Foucault only posed the question: How have we come to the situation which we are in; Flyvbjerg added the questions: Is this desirable, and if not, what should be done about it?

Flyvbjerg not only took Foucault's works further in this regard, he also showed how Foucault's work can be used within the phronetic approach to social science. There are a number of authors who have worked with the concepts of phronesis, Flyvbjerg is one of them, and the reason why I have chosen specifically Flyvbjerg as the key author on phronesis in this thesis, is that Flyvbjerg not only operationalized Foucault and took his works one step further, but also described how Foucault's approaches can be framed scientifically in relation to phronesis, i.e. how Foucault's works can be used in phronetic research, and discussed the implications in relation to issues around for example objectivity, verification and generalization of the results of research.

Let me frame this a bit more elaborately. Foucault once argued:

"No, I am not looking for an alternative; you can't find the solution of a problem in the solution of another problem raised at another moment by other people. You see, what I want to do is not the history of solutions, and that's why I don't accept the word "alternative". I would like to do genealogy of problems, of *problématiques*. My point is not that everything is bad, but that everything is dangerous, which is not exactly the same as bad. If everything is dangerous, then we always have something to do. So my position leads not to apathy but to a hyper- and pessimistic activism" (Foucault in interview, cited in Dreyfus & Rabinow 1983)

What I will create in this thesis, is not a theory, in the classic economic understanding of what theories are, about what happens when global MNCs enters local clusters. Through a study of

how people are constructed as subjects within one specific cluster, which experienced MNC entry, and how this specific cluster itself was constructed, inspired by the works of Michel Foucault, I will write a history of some of the “*problématiques*”, which can emerge when MNC entry into clusters occurs. And using the phronetic approach developed by (Flyvbjerg 2001) I will add the questions, was this development desirable, and if not, what should have been done about it.

And this is the scientific contribution of this thesis; it is to high-light these problems in relation to MNC entry into clusters, so that other people in other clusters may remember to think of these potential problematics in the future. I do not argue that the specific problems illuminated in the specific cluster investigated in this thesis will also be problems in other clusters; I do not even argue that the solutions I present in relation to this specific cluster will work for other people in other clusters, I simply raise a flag to raise awareness about these problematizations, and hope that other people in other clusters will at least reflect on whether these problematics may also be issues in their situations. What is generalizable from this thesis is thus not the “solutions”, but the problematizations I identify.

By thus choosing this combination of Foucault and Flyvbjerg as the basis for this thesis, I choose an approach to science which is fundamentally different from most of the research in the cluster literature, which is based on ideals borrowed from economics, and thus the natural sciences, and the use of theories and hypothetical-deductive research designs. In his work (Flyvbjerg 1998a; Flyvbjerg 2001), Flyvbjerg develops the concept of phronetic social science, drawing on the work of a number of authors from Aristotle’s over Frederick Nietzsche to Michel Foucault and Hubert and Stuart Dreyfus. His argument is concisely put, that whereas the natural science is based on theories, and on prediction and explanation, it offers little to say about interests and values:

“... just as the social sciences have not contributed much to explanatory and predictive theory, neither have the natural sciences contributed to the reflexive analysis and discussion of values and interests, which is the prerequisite for an enlightened political, economic, and cultural development in any society, and which is at the core of *phronesis*” (Flyvbjerg 2001, p.3 Original italics)

If social science places values and interests at the centre of the analysis, then it can make a difference in society again, it can matter again, because with a science based on values, it becomes possible to start analyzing what direction society should move in, not just how it can move. Richard Livingstone said the following about our situation today: “if you want a description of our age, here is one: the civilization of means without ends” (Flyvbjerg 2001, p.53). Phronetic research is about the ends, not only the means. (Flyvbjerg 2001, p.60) thus places the following questions at the core of social science:

1. Where are we going?
2. Is it desirable?
3. What should be done?

This is a way of framing social research which captures what Foucault was talking about, when he talked about problems in the quote above. What Foucault did was an analysis of problematizations; it was analysis of madness, of disciplinary practices, of sexuality, of ethics, etc. A problematization, according to Foucault:

“... does not mean the representation of an object that did not exist. It is the ensemble of discursive and non-discursive practices, that make something enter into the play of true and false and constitute it as an object of thought (whether in the form of moral reflection, scien-

tific knowledge, political analysis, etc.)” (Rabinow & Rose 2003, p.xviii, Foucaults own words cited)

What Foucault did, was thus to analyse how things came into being something, which could be problematized, such as the notion of madness, and to which different solutions could be offered, and this is the link to Flyvbjerg’s argument about doing something. It is after an analysis of how things have come to be what they are, or to use Flyvbjergs terms, “where are we going”, that it becomes possible to discuss whether the current “direction” is desirable or not, and thus whether or not something should be done. And such contemplation must include the notion of values per default, i.e. the question: is the situation we are in desirable or not? In this thesis I will similarly do an analysis of problematizations, an analysis of the problematizations emerging when MNCs enters clusters.

The reason for combining Foucault and Flyvbjerg as the basis for my analysis, and not settling with the relatively new and influential phronetic approach made by Flyvbjerg is that I find it necessary to elaborate on the analytical aspect of Flyvbjerg’s approach. While Flyvbjerg bases his approach on the works of Foucault, he does so in a way where he values especially the genealogical method, and places focus on practices, arguing that practice is more important than discourse.

I will argue, and this is my reading of Foucault’s work, that Foucault’s approach is more elaborate than such, and that we can only understand genealogy if we also look at the archaeology, because, if we read Foucault’s works this way, which is backwards, by taking as the point of departure genealogy and then going back to archaeology, then it becomes clear what role discourses plays in Foucault’s latter works which rests on genealogy. I agree with the newer readings of Foucault in the secondary literature, for example in (Raffnsøe, Gudmand-Høyer, & Thanning 2008), that there are some themes which runs through all of Foucault’s works, a point which (Flyvbjerg 1998a) also makes. However, as I read “The Archaeology of Knowledge” (Foucault 1972), I believe that practice is part of discourse. And therefore, if the focus in analytical work is narrowed to practices, then we do not see the whole picture, because we miss the impact of discourses. If focus is placed only on genealogy, then the resulting analysis is focused on events, the chronology of such, and the emergence and descent of such. And such analysis risks becoming a relatively simple analysis of who does what to whom, and as such comes close a rather simple and classical Hobbes based analysis of power. Remember, that Hobbes saw power as something possessed, whereas Foucault saw it as something enacted (Clegg 1989). It is therefore necessary to include also the discourses surrounding the events in the analysis, or in other words, the discourses of which the practices studied are part of, as I will argue by reading “the archaeology of knowledge” through genealogy, because then the analysis reveals in more details why some events occurred while others did not, and as such illuminate in more detail the dynamics unfolding.

I will therefore structure this second part of the thesis as follows: Firstly, in this chapter, I will present Foucault’s works. I will first discuss how to use Foucault’s work, and then continue to my reading of genealogy and archaeology, the two methods which will form the basis for my analysis in part three. Subsequently, I will discuss the differences between Wenger and Foucault, to highlight the differences between the two, so that the cluster researcher familiar with Wenger’s theories of learning, but unfamiliar with Foucault’s works, can see what Foucault’s genealogy and archaeology captures that Wenger’s does not, and thus why a Foucauldian approach is well suited to answer the research question.

Secondly, in chapter 4, I will turn to the works of Flyvbjerg, and the phronetic approach to science. I argued earlier, that Foucault’s methods make it possible to take the first step of investi-

gating how the current situation has emerged. Flyvbjerg's contribution is to take the two next steps and question whether this is desirable, and if not, what should be done about it.

Finally, in chapter 5, I will combine the discussions from chapter 3 and chapter 4, and use them as the basis for a discussion of the design of this thesis, the choice of the case study approach, the choice of case, and the constructed of the analytical approach to this case. In relation to the analytical approach, I will also discuss what my contribution is, which is a backward reading of the two concepts of genealogy and archaeology. Part two of this thesis will thereby form the basis for the case study in part three.

Foucault is one of the most used authors in the social sciences, and to understand the challenges it poses to use Foucault's work, let us start by looking at one of the fields in which he has been used: organization studies. As (Carter, McKinlay, & Rowlinson 2002) pointed out in their editorial, much has been written about Foucault in organizational studies, however, as underlined by (Knights 2002), much of this literature does not really deal with Foucault's contribution. Often he is only used for what may be called ornamental purposes, which means that people flag his name without really using his contribution. And this seems to be a tendency running through many fields within the social science. (O'Farrell 2005) thus presents an illustrative account of how Foucault has gained an almost mythical status in some areas of society while his name causes hostility in others. She argues:

"To use Foucault's name is an efficient means of demonstrating both intelligence (one can 'understand' his work) and radicality (one is 'subverting the status quo'). Alternatively, Foucault's name is reviled by others as indicating a sea of unintelligible jargon, airy-fairy trendy French nonsense, political and moral nihilism or alternatively, a new intellectual terrorism." (O'Farrell 2005, p.2)

Further, possible due to the size and the complexity of his work, as well as Foucault's style of continuously changing his methods and applying them on new topics, the literature about his ideas is relatively complex and has in some cases moved away from Foucault's own ideas. As (O'Farrell 2005, p.10) puts it: "There now exist entire books which purport to be about Foucault, but which scarcely refer to his original work – focusing instead on what others have had to say about him".

In this thesis the goal is to develop two of Foucault's methods into an analytical approach which can be used to study how people are constructed as subjects within organizations in clusters, and how the clusters they are part of, are constructed as clusters, and the basic question is therefore, given the many different views upon Foucault's work, the size of his work, and the different interpretations of his work in the secondary literature: How should I start this presentation of Foucault's ideas?

3.1 Using Foucault works

I think it is best to start the journey into Foucault's works by touching upon the following question: What was Foucault's goal with his work? Foucault argued himself, that his work should be seen as a toolbox: "I would like my books to be a kind of tool box which others can rummage through to find a tool which they can use however they wish in their own area" (O'Farrell 2005, p.50 Foucault's words cited). So what kind of tool box did Foucault provide? Why did I not entitle this section something like: "Foucault's theories"? In some contributions authors refer to the 'theories' of disciplinary power and bio-power developed by Foucault, but Foucault did not develop theories as understood in the classical natural science sense:

“Do we need a theory of power? Since a theory assumes a prior objectification, it cannot be asserted as a basis for analytical work. But this analytical work cannot proceed without an ongoing conceptualization. And this conceptualization implies critical thought – a constant checking” (Dreyfus & Rabinow 1983, p.209 Foucaults own words cited)

“If one tries to erect a theory of power one will always be obliged to view it as emerging as a given place and time and hence to deduce it, to reconstruct its genesis. But if power is in reality an open, more-or-less coordinated (in the event, no doubt, ill-coordinated) cluster of relations, then the only problem is to provide oneself with a grid of analysis which makes possible an analytics of relations of power” (Dreyfus & Rabinow 1983, p.184 Foucaults own words cited)

The reason why Foucault dismisses the notion of a theory of power in this quote, is that he dismisses the notion of theories as they are understood in the natural science ideal, which I will elaborate on later. Foucault does not believe in universal and predictive theories, in the social sphere, because such will assume that something is constant in society, that something is fundamental. Foucault argues that nothing in society is fundamental or constant, as will be clear when we look at his writings on genealogy, in section 3.2. What Foucault did instead was problematizations. These can also be understood as “theories”, but they are another type of theories than the universal and predictive “theories” found in natural sciences. In chapter 4 I will discuss how the research Foucault did, can be framed using (Flyvbjerg 2001) concept of phronetic research and generalization within such. I will return to this point later because it will become more accessible, when we have looked at what Foucault was trying to do, and two of his methods in detail. The important argument to note here is, that Foucault did not create universal predictive theories; he did problematizations, which is something different.

The problematizations Foucault made throughout his authorship all in some way centred around the issue of how humans are made into subjects, as he argued in the essay “The Subject and Power”:

“I would like to say, first of all, what has been the goal of my work during the last twenty years. It has not been to analyze the phenomena of power, nor to elaborate the foundations of such an analysis. My objective, instead, has been to create a history of the different modes by which, in our culture, human beings are made subjects.” (Dreyfus & Rabinow 1983, p.208)

Foucault further explains in this essay, that it was not power but the subject that was the theme of his research. However, he became “quite involved with the question of power” (Dreyfus & Rabinow 1983, p.209), as he puts it², because it appeared to him, that the human subject he was studying was placed in a set of power relation. And whereas Foucault could turn to say economic history as an instrument to understand the relations of production in society, there were no tools available to understand power. Foucault therefore needed to create such tools if he was to reach his goals. In the first volume of “The History of Sexuality” Foucault thus makes it clear, that what he is trying to do is to create an analytics of power, not a theory, quote:

“The aim of the inquiries that will follow is to move less toward a “theory” of power than toward an “analytics” of power: that is, toward a definition of the specific domain formed by relations of power, and toward a determination of the instruments that will make possible its analysis.” (Foucault 1998, p.82)

He is not interested in the power relations for the sake of power relations, rather he is interested in understanding how humans are made into subjects in our society, and since this domain is

² Maybe this statement by Foucault should be seen as quite an understatement, according to (O’Farrell 2005), since the issue of power occupies large parts of his later contributions.

shaped by power relations he needs to determine the instruments, in other words the analytical method, which will make it possible for him to study power relations and hence the domain they create. As he argues:

“... I wish to suggest that one must analyze institutions from the standpoint of power relations, rather than vice versa, and that the fundamental point of anchorage of the relationships, even if they are embodied and crystallized in an institution, is to be found outside the institution” (Dreyfus & Rabinow 1983, p.222)

Foucault has therefore focused upon developing analytical frameworks; tools which could be used in the analysis of certain situations or events or objects in society. The point for him was therefore *not to create a theory explaining what power is*, but instead to *develop analytical frameworks*, some of which could be used to *analyze how power functions in society*. And it is two of these analytical frameworks I will draw on in this thesis. We shall later see in chapter 4, that the approach of putting power at the centre of the analysis is also a point (Flyvbjerg 2001) draws from Foucault, when he argues, that power should be placed at the centre of the analysis within the phronetic approach to social science.

Why did Foucault focus upon understand how people are made into subject? Foucault wanted to create analyses that would help change things in contemporary society, a point (Flyvbjerg 2001) also makes in relation to phronetic social sciences, when he argues for researchers to avoid “so what” research, as I return to in chapter 4. This idea about changing things, is the basis for the idea of writing “the history of the present”, which I shall return to in section 3.2. In the essay “The Subject and Power” Foucault argues that

“Maybe the target nowadays is not to discover what we are, but to refuse what we are. We have to imagine and to build up what we could be to get rid of this kind of political “double blind,” which is the simultaneous individualization and totalization of modern power structures. The conclusion would be that to political, ethical, social, philosophical problem of our days is not to try to liberate the individual from the state, and from the state’s institutions, but to liberate us both from the state and from the type of individualization which is linked to the state. We have to promote new forms of subjectivity through the refusal of this kind of individuality which has been imposed on us for several centuries” (Dreyfus & Rabinow 1983, p.216)

According to Foucault, as he has analyzed in length in his books, humans in contemporary society is constructed both as objects and subjects, and the aims of Foucault’s history of the present is to make people aware of how they are constructed so they can act against the processes constructing them as certain objects and subjects. The reason for writing the history of the present French prison was partly that Foucault did not like what he saw in contemporary French prisons, as discussed in (O’Farrell 2005; Raffnsøe, Gudmand-Høyer, & Thaning 2008), partly a wider concern of Foucault’s with how disciplinary practices functioning in contemporary society. This approach also carries a focus on values, people have to question what they have become in society, and to question arguably entails a focus on values. It is impossible to question something, without a notion of values, an understanding of whether something is better or worse. So values are an underlying issue in Foucault’s work, and this is what Flyvbjerg draws on and highlights in his work on phronetic social science, which I shall return to later. Foucault argues in the essay “The Subject and Power”:

“What is to be understood by the disciplining of societies in Europe since the eighteenth century is not, of course, that the individuals who are part of them become more and more obedient, nor that they set about assembling in barracks, schools, or prisons; rather that an increasingly better invigilated process of adjustment has been sought after – more and more

rational and economic – between productive activities, resources of communication, and the play of power relations.” (Dreyfus & Rabinow 1983, p.219)

So what Foucault did was not a study of the prisons in France, but instead a study of the disciplinary practices that constituted people as objects at given points in time, and he studied these practice through a study of power relations, and it was these he questioned with his work, these practices he problematized, to use another term. He thus studied the prison though a study of how power relations works in the institution. How exactly he arrived at the relative “broad theme” of disciplinary practices in society from the relative specific theme of “prisons”, by writing the history of the present prison is a matter of his methods, which I shall focus on later.

This is also the reason why Wenger and Foucault to a certain extent complement each other, because where Wenger gave us ideas which can be used to conceptualize and analyze how *people learn and in that process create their identity*, Foucault gave us ideas which can be used to analyse how *people are shaped into specific subjects*. I am not arguing here, that Foucault did not leave any room for actions by the individual subject. The individual subjects do indeed have agency, a possibility to change their life, in Foucault’s writings, and my point is that at a micro level, Wengers and Foucault illuminates from different perspectives how people become the subjects they are. Wenger focused upon learning, and how people learn to be something, for example a claims processor, and how they in that process shape their identity from the experience of that learning. Foucault focused more directly on identity, on how people through their actions as well as through different structures where shaped into specific subjects. Or in other words, not so much how they learned to be something, such as claims processors, but more on how they learned to be acting subjects, how they learn to be themselves. This point will of course become clearer throughout this chapter, when I discuss the detailed content in some of Foucault’s works, and presents a critical reading of Wenger’s theory on this basis, but for now the thing to note, is that while Foucault analyzed how people are shaped into subjects, Wenger analyzed how they learn and in the process creates an identity. My argument will be that while persons within an organization within a cluster are indeed forced into specific roles, then they still have an agency for learning, and both Foucault’s and Wenger’s ideas are relevant to illuminate the issue of identity and the factors shaping such. However, if the goal is to understand how the entry of MNCs into clusters changes people, then a focus on the practices and discourses shaping the subjects within the cluster, and the changes of such is necessary, and a Foucauldian approach makes it possible to conceptualize and analyse these directly in more detail, than a Wengerian approach, which only touches on this through a focus on learning. Further, as (Wenger 2004) also argues, the power side of his theory is not fully developed, and therefore it is not capable of illuminating the power relations which are important for an analysis of how subjects are shaped. Foucault on the other hand places focus directly on power relations, while maintaining a focus on practices and discourses. This was what I realized during my case study and why I dismissed the Wengerian approach and chose the Foucauldian instead. Since my rationality for arguing that a Foucauldian approach to the study of people and organizations within a cluster, as well as a cluster itself is valuable, is this realization, then it is necessary to discuss in detail this difference between the two authors in section 3.4. In that section I will discuss the contribution of Wenger in detail, and read it critically using Foucault’s ideas. The discussion will show, that in relation to the objective of investigating how subjects are created and changed through time, Wenger is too narrow in his focus, because his focus is on how people learn to be something, such as claims processors, and through this how they develop their identity, but in choosing this focus he lacks a focus on power, and also on the context of the learning process. For example the question: How was the claims processing profession constructed, which made possible that the persons he was studying could learn to be claims processors? This he treats as a given constant context. Foucault on the other hand has a wider focus, which include the construction of such context. Therefore although the Wenger and Foucault are com-

plementary in as much as they both illuminate parts of how identity is constructed, Foucault's analytical framework captures more of the process, by including the construction of the context which makes it possible to learn to be something. And this difference is what I will clarify in section 3.4, to argue for the necessity of the Foucauldian approach as opposed to the Wengerian approach.

One should also note at this point the issue, that whereas Foucault made analytical frameworks, and dismissed the classical notion of universal and predictive theories found within the natural sciences and made problematizations instead, Wenger did make theories. The critical reader might therefore question how I am able to compare the two? This is because that although Wenger creates a theory on learning, his work comes out of an empirical research tradition, where extensive empirical case studies is the basis of his work, and his analytical focus is placed on investigating and understanding the practices among the people he studies, and further, although he makes a theory on learning, it is not a theory which lives up to the classical natural science ideal of theory, which I shall discuss in chapter 4. It is not a theory presenting precise rules and laws for how learning occurs on an abstract level, which is universal and predictive, and as such strives to meet the ideal for theories as understood in natural sciences. On the contrary, it presents to the reader an elaborate way of conceptualizing and analysing learning processes, and it underscores, that if the researcher is to analyse and understand how learning occurs in a specific context, then he has to investigate it empirically and analyse the practices in that specific context. And as such, it in some circumstances comes out as something which looks like what one may call a problematization on how learning occurs in specific contexts, more than a classical theory on learning. One can therefore say that thereby Wenger is close to a Foucauldian approach, which also values the empirical dimension and the focus on practices. Although Wenger thus comes close to a Foucauldian approach, there is also one important difference, which is that Wenger lacks the focus on power in his analysis, which is central to the Foucauldian approach, see for example Wengers own discussion of this lack in (Lave & Wenger 1991; Wenger 2004) as well as the discussion of the issue in (Fox 2000).

Having chosen a Foucauldian approach the next question is this how to use Foucault's works as an analytical framework? This demand a focus on what analytical frameworks Foucault developed.

As some authors has pointed out, for example (Dreyfus & Rabinow 1983; Flyvbjerg 1998a), Foucault remained rather silent about his methods. When we look at what he wrote about his methods and judge from his work how they were used, we see that he did not use one specific method. Neither did he use different methods at different times in his authorship. During his academic venture, he utilized several methods, developing them along his way, refining them, reinventing them, and putting them to new use as his insight in the topics he studied evolved and his interests changed. This leads to the first question: Were there different phases characterized by new ideas or can his works be understood as being relatively coherent?

This is one of the large questions in the secondary literature about Foucault (O'Farrell 2005; Raffnsøe, Gudmand-Høyer, & Thaning 2008). According to some parts of the secondary literature there were quite clear distinctions between the different phases in his authorship, while other parts of the secondary literature argues that there are some coherence in his authorship (Raffnsøe, Gudmand-Høyer, & Thaning 2008). The periods in Foucault's authorship which are widespread in the secondary literature on Foucault is according to (Raffnsøe, Gudmand-Høyer, & Thaning 2008, p.41) the following:

- 1954-61: A phase where Foucault is under influence from phenomenology and existentialism.
- 1961-63: Earliest phase of his real authorship, a romantic phase characterized by a search for originality.
- 1963-71: A discourse theoretic and semi-structuralistic phase.
- 1971-76: A social analytic and power-theoretical phase.
- 1976-84: An ethic and subject oriented phase

The presence of different phases, compatible or incompatible, has caused some controversies in the secondary literature. Some argues that there is some coherence between the ideas and methods Foucault developed and used in different phases while others argue that they were different ideas and methods. As an example we can look at the relationship between the archaeological method and the genealogical method. In the phases until 1971, in the scheme above, Foucault's work was characterized by a focus on the archaeological method. Later he was more focused upon the genealogical method. How exactly the two methods are combined in his work, and therefore how they should be used, has caused controversies. (Dreyfus & Rabinow 1983, p.104) points out: "There is no pre- and post-archaeology or genealogy in Foucault. However, the weighting and conception of these approaches has changed during the development of his work", but still argues that after 1971 Foucault became more interested in the genealogical method, and that the two methods are relatively incompatible. (Raffnsøe, Gudmand-Høyer, & Thaning 2008) on the other hand criticizes some secondary literature, and (Dreyfus & Rabinow 1983) explicitly in this regard, for drawing so sharp a line between the two methods. In the following analysis of Foucault's work on genealogy and archaeology, I will read the two methods as coherent and compatible, which is in line with the argument made by (Raffnsøe, Gudmand-Høyer, & Thaning 2008), and as I will elaborate on, I will read them backwards, by taking point of departure in genealogy and then going back to archaeology.

The discussions about Foucault's ideas and methods and the changing nature of these, as well as the different topics he has worked with, has also lead to questions about in which scientific box to put Foucault. One can say, that this is the second big question in the secondary literature. How was his relation to for example hermeneutics and to structuralism? Foucault did not like to be put in categories, and therefore I shall not go into a discussion about his standpoint here, and instead leave this discussion to the secondary literature, see for example (Dreyfus & Rabinow 1983) and (O'Farrell 2005) for this discussion. What I will do is instead to locate myself within the phronetic approach to social science, which is compatible with the methods developed by Foucault, and his approach to science, and in chapter 4 I will present this approach to science.

Given the sheer size and complexity of Foucault authorship, the size of the daunting secondary literature dealing with Foucault's ideas, the limited explicit writing on methods by Foucault himself, the ongoing discussion about different phases in his authorship in the secondary literature and the ongoing discussion about how to label him in, it hardly comes as a surprise, that there is no way near any agreement about how to use Foucault's ideas in the secondary literature. And indeed, some of the contributions proclaiming to use him have moved so far away from his own writings, possibly due to the use of secondary literature building on secondary literature etc, that it is hard to find any of Foucault's original ideas in these publications as argued by (O'Farrell 2005).

Given this situation, I have decided to use both secondary literature on Foucault as well as my own readings of some of Foucault's key works in relation to genealogy and archaeology. I will use Flyvbjerg's work, which builds on Foucault's works and takes it one step further, as argued earlier. The important contribution of (Flyvbjerg 2001) is, that he takes the ideas of Foucault

and merges these with another set of ideas about what social science is and ought to be, and by doing so he builds an approach to social science, and produces some guidelines, which helps to clarify what it means, scientifically, to use a Foucauldian approach, and also clarifies how to use the case study approach. This does not mean, that I could have based this thesis on (Flyvbjerg 2001)'s work alone, because, as argued earlier, and as I will elaborate upon later, Flyvbjerg values an analytical focus on practices over discourses, but I find that if one reads Foucault's works on archaeology through his genealogy, then it becomes clear that both practices and discourses must be integral parts of the analysis, and that practices are actually part of discourses, which means that it becomes necessary to investigate the discourses to uncover fully the dynamics leading to the observed practices.

My reading of Foucault's works has not only been inspired by the works of Flyvbjerg. The old and now classical work by (Dreyfus & Rabinow 1983), enlightened me, but the one secondary book which has had the largest impact, is the relatively new Danish contribution (Raffnsøe, Gudmand-Høyer, & Thaning 2008) which offers a detailed description and interpretation of all of Foucault's works. I must admit, that although I have read several of Foucault's works, and some more than once, I am probably inspired in my readings by (Raffnsøe, Gudmand-Høyer, & Thaning 2008). To give them the credit they deserve, I will therefore try to note the places in the following, where I read Foucault in line with their reading.

There is another line of secondary literature dealing with Foucault's work, which I have not used, and this is the literature trying to merge Foucault's ideas with other theories on power. I must admit that I have not gone through the whole literature, but only those I have deemed to be key contributions. The first contribution I will discuss in this group is the now classical contribution by (Clegg 1989). This work offers an interesting way of locating the work of Foucault in relation to other theories on power. However, when (Clegg 1989) starts developing his own understanding of power and in this process merges Foucault's ideas with other theories on power, I think that he makes the error of forgetting some of the underlying ideas and assumptions in Foucault's work. And it is exactly the same error I find in one of the other widely cited book on power (Allen 2003), as well as in (Bathelt & Taylor 2002), as discussed earlier. The issue is, that although Foucault wanted his works to be used as a tool box, where authors could pick tools and ideas, and use them for their own ventures, this does not mean, as (O'Farrell 2005) points out, that people can pick specific concepts, such as discipline, discourse, power, genealogy etc., and use them randomly in their texts. As (O'Farrell 2005) and (Raffnsøe, Gudmand-Høyer, & Thaning 2008) points out, certain themes or assumptions runs through all of Foucault's work, and as (O'Farrell 2005) argues, people who use Foucault need to be aware of these themes and assumptions, when they pick ideas from Foucault's works and uses these ideas in their own works. As (O'Farrell 2005) puts it:

"It is the absence of one or more of these assumptions in scientific applications which can make the latter appear, in some cases, so puzzlingly different from the original, in spite claims to be derived (to greater or lesser extents) from Foucault's work." (O'Farrell 2005, p.54)

She thereafter presents the five assumptions, or principles, which according to her can be found in Foucault's work:

1. Order: "... it is possible to produce and describe all human knowledge and culture in an orderly manner, but at the same time, human attempts to create order are always limited and crumbling at the edges" (O'Farrell 2005, p.54)
2. History: "The best tool to examine and dismantle existing orders is history" (O'Farrell 2005, p.54)

3. Truth: "... truth is a historical category. It is also a notion that has been of particular importance in Western history which has been marked, particularly since the Enlightenment, by a struggle between two mutually opposed methods of gaining access to the truth. On one side there is the 'intellectual' or 'scientific' method which has gained ascendancy since Descartes and on the other hand an older method involving spiritual self-transformation and limit-experiences." (O'Farrell 2005, p.54)
4. Power: "... knowledge is always shaped by political, social and historical factors – by 'power' – in human societies." (O'Farrell 2005, p.54)
5. Ethics: "...social justice is an essential ethical consideration that requires close and constant attention, examination, and action" (O'Farrell 2005, p.54)

I agree that there are such themes underlying Foucault's work, but I think that (O'Farrell 2005) is too focused on power, in her fourth point above, when she argues that knowledge is shaped by power, because when examining which Foucault's texts, we see, that knowledge is indeed shaped by power, but Foucault presents some detailed discussions about the relationship between the two in (Foucault 1991), from which it is also clear that power cannot exist detached from knowledge. To return to the contributions trying to merge Foucault with other theories on power, I often find these puzzling and illogical, because the ones I have seen so far all ends in a situation where they somehow uses Foucault in a way which does not fit with the underlying ideas in his authorship.

Therefore, I will build this thesis on my own reading of those of Foucault's texts, which I find useful for my investigation, as well as Flyvbjerg's work, which I find manages to maintain the themes running through Foucault's work, although the discourses and their importance slips in the background in Flyvbjerg's work. I shall therefore not take my point of departure in (O'Farrell 2005), (Raffnsøe, Gudmand-Høyer, & Thaning 2008) or (Dreyfus & Rabinow 1983) or others reading of Foucault, but my own reading of his works on genealogy and archaeology. Thereafter I shall elaborate upon the ideas presented in these texts to make them usable in my own investigation, which will in turn, fall within the approach to social science that (Flyvbjerg 2001) terms phronetic.

I need to present one last reflection in relation to my approach to the theory in this thesis, if one calls Foucault's work theory, and this is the matter of the "newness" argument. I was at a conference presenting some of my work on power and clusters, and a discussant, who was a major name within cluster studies, gave me a comment, which went something like: You use Foucault's work, which are rather old, have you considered using some newer contributions to the power literature? There must be newer contributions? I believe that science is about using the best theories, and not necessarily the newest, and further, I do not only use Foucault's works, I also use Flyvbjerg's works which are relatively newer, which interprets Foucault's works and adds important dimensions to it, and further, my readings of Foucault's works is also inspired by the new contribution in (Raffnsøe, Gudmand-Høyer, & Thaning 2008). So yes, I am using Foucault's work, which dates back to the early 1970's, but I also include newer literature in the discussion thereby presenting a contemporary use of Foucault's works.

The ideas I will draw from Foucault relates mainly to his writings on genealogy and archaeology. Since (Foucault 1972), which is the key work in relation to the archeological method, only makes sense when read in relation to other of Foucault's work, I will present it after the presentation of Genealogy. This might seem counterintuitive, since Foucault first developed the archaeology and afterwards refined some of his ideas in his work on genealogy. The reason for presenting them backwards is that as (Raffnsøe, Gudmand-Høyer, & Thaning 2008) argues, and I agree with this,

that “The Archaeology of Knowledge”, (Foucault 1972), does not make sense if it is read on its own, it has to be read in relation to “The Order of Things”, (Foucault 2002), which came before it. And adding to this I will argue, that to understand the role played by archaeology in Foucault’s later works, one also have to read “The Archaeology of Knowledge” in relation to the work on genealogy. Therefore I start with the genealogy, which is relatively well described by Foucault in relation to basic assumptions underlying the ideas. Subsequently, I will move back to the ideas developed in (Foucault 1972), because this work holds some ideas which are important, if we are to understand certain key concepts and assumptions which underlies Foucault’s genealogical work, and especially the role of discourses in relation to genealogy. This of course also means that “The Archaeology of Knowledge” becomes interpreted in a special light. “The Archaeology of Knowledge” has sometimes been understood as a purely discursive endeavor, which has given rise to purely discursive analysis which has been presented as Foucauldian. When read in the light of the genealogy it becomes clear, that archaeology also includes a focus on practice, and also, that discourses are important for genealogical analysis.

In other words, although the works on genealogy seems relatively complete and accessible, my point is that we can only understand his ideas presented in relation to genealogy in detail by also looking at some at the ideas developed in relation to archaeology, and such reading of his works are necessary for the application of his ideas.

Given the ideas of Foucault, the goal of this chapter is to develop an analytical framework in the form of a conceptualization of the analysis at hand and the principles that should guide it, using Foucault’s ideas on genealogy and archaeology. When I begin the case study in the third part of the thesis, I will continually return to the ideas of Foucault as I go through my case study, discussing the implications of the ideas in relation to the empiric data, and the other way around; adding perspectives on Foucault’s ideas using the empiric data.

This operationalization is thus different from what one might expect to find in a Ph.D. thesis. I do not develop a precise conceptual understanding of what an organization within a cluster is, what a cluster is, how the two should be conceptualized and analyzed, what dynamics or processes to investigate and how different results should be interpreted using different theories on clusters. In other words, I do not have a theory, which I use in accordance with the ordinary deductive research design. I have instead a collection of Foucault’s ideas, which fits together and support each other, as I will discuss in the following, and by fusing these with the work of Flyvbjerg, I will develop the analytical framework which will be the basis for my case study. What I am going to create in chapter 5 is thereby not a final method, which I can use step by step. Instead it is synthesis of Foucault’s and Flyvbjerg’s works which are used to create a basis for a case study aimed at exploring what happens within clusters, when the local place that we call the cluster, meet the global organizations that we call the MNCs, and identify and describe the problematizations which can emerge in such an situation.

Some might say that this is an alternative approach in a Ph.D. thesis, the goal of which, amongst other things, is to show that the author is capable of carrying out scientific work, because I do not present clear cut theories, understood as universal and predictive theories in the vein of the natural science ideal, and operationalized these, or uses a deductive or inductive research design. I have thought long and hard about choosing this approach. In the beginning I tried to fit Foucault into what I may call the orthodox cluster study approach, i.e. as a theory on power that were to be combines with other theories on the dynamics within clusters, and operationalized into a number of hypotheses which could then be investigated through empirical studies, which could in turn give rise to new theories, and thus add to the cluster literature. I shall return to what I mean by theory in chapter 4. But as I tried to do so, I realized that what I was then doing was not a Foucauldian analysis. It was a sort of mixture which made no sense. It was not a Fou-

cauldian approach because Foucault did not make universal and predictive theories; he dismissed the notion of theories, as discussed earlier, and made problematizations, so who was I, trying to use his ideas as a universal and predictive theory? Or to create universal models of which he was rather skeptic? The only way in which I could use him correctly, and build upon his ideas, was to adapt his way of carrying out analysis, in other words, his approach to science.

So what am I doing? Inspired by the clever wordplay by (Knights 2002) in relation to the use of Foucault in organizational studies, I will argue, that I started out wanting to “write Foucault into cluster studies”, i.e. make use of his some of his ideas within the field of cluster studies. But then I realized that I needed to write “Cluster studies into Foucault” instead, i.e. to make a Foucauldian analysis about the issues of clusters and MNCs and the relationship between these two. Shortly put, I had to choose the Foucauldian approach, and then use it completely, in a logical and coherent way, and combine it with other contribution which does the same, such as (Flyvbjerg 2001). I could not just take some of Foucault’s ideas and concepts, pick them out of a larger context, and try to fit them into the normal scientific approach found within the cluster literature. This means that the approach to science within this thesis is different compared to the approach found in much of the cluster literature, and in chapter 4 I will discuss, using (Flyvbjerg 2001), what kind of science this thesis constitute. Let us now turn to the works of Michel Foucault, and more specifically his genealogy.

3.2 Genealogy

Before I can make arguments about how and why to use ideas from the genealogy in relation to cluster analysis, let me begin by presenting the main concepts of this method, if we consider it a method. Foucault’s writings on genealogy does not hold within it an ontology, describing the “being” in the world, but rather the argument, that we must analyze how the things that are in the world has become what they are. Thus genealogy describes what can be termed a methodology to do so, or an analytical framework. (Dreyfus & Rabinow 1983) thus argues:

“Foucault (like later Heidegger) replaces ontology with a special kind of history that focuses on the cultural practices that have made us what we are.” (Dreyfus & Rabinow 1983, p.122)

So instead of an ontology, Foucault’s presents a special kind of history, the so-called “history of the present”. What is the point of writing the history of the present? Does Foucault really write a history of the prison? Does he not write a broader history about disciplinary practices in contemporary society instead? As I read the book, he does write the history of the prison, but his point is that one cannot understand the emergence of the prison, as we know it, without looking at some broader dynamics in society, specifically the disciplinary practices developed in the army, the workplaces and the schools. By investigating how these disciplinary practices functions and how they have spread and developed across society, Foucault is capable of identifying how the prison as we know it came into being, thereby writing the history of the present.

If we look at how he conducts this analysis, we see that he starts his book with a description of the torture and execution of Damiens in 1757, who had tried to murder the French king. Foucault describes this spectacle in all its gruesome detail. Afterwards he describes a timetable from a prison in Paris, as it was eighty years later, describing in detail the prisoners’ duties during the day. He then concludes that the public execution and the timetable each define a certain penal style. He then makes it clear that many changes occurred in relation to punishment in the less than 100 years which separate these two events, and among all these changes he will focus upon one: “Among so many changes, I shall consider one: the disappearance of torture as a public spectacle” (Foucault 1991, p.7) Thereafter he begins his analysis of this, and during the next approximately 300 pages he links the disappearance of torture as a spectacle to the emergence

of disciplinary practices in society and thereby finally explains the emergence of the prison as we know it.

This beginning of the book is interesting, because it constitute an example of how Foucault puts the genealogical method to use. In short, the point is that he investigates how one event, understood as a change in force relations in society, in this case reflected by the changing penal style, emerges and what the descent of this event was. So we have an event which is put into focus and its emergence and descent is investigated. To understand the meaning of the event, emergence and descent, and how these terms are used in the genealogical method, we need to turn our focus to the essay "Nietzsche, Genealogy, History" published some years prior to "Discipline and Punish".

In this essay Foucault presents the genealogical method which formed the basis of much of his work in Discipline and Punish as well as the first volume of the History of Sexuality, and if one wants to understand the genealogical method and how to apply it, then this essay is key. Foucault begins the essay by describing what characterizes genealogy, which is the following:

"Genealogy is gray, meticulous, and patiently documentary. It operates on the field of entangled and confused parchments, on documents that have been scratched over and recopied many times" (Foucault 1984a, p.76)

What is genealogy meant to uncover in this process? To understand the answer to this, and hence the reason for using genealogy, we need to start with the observation that genealogy opposes itself to the search for origins, to the search for the "Ursprung". Foucault, and before him Nietzsche, dismisses a search for the origin, and the reason is, that a study of the origin is in fact an attempt to study things in their clearest form, and it rests on the idea that in the origin it is possible to see things in their clearest and pure form. Nietzsche and Foucault do not believe in the existence of "immobile forms that precede the external world of accident and succession" (Foucault 1984a, p.79). He argues that:

"... if the genealogist refuses to extend his faith in metaphysics, if he listens to history, he finds that there is "something altogether difference" behind things: not a timeless and essential secret, but the secret that they have no essence or that their essence was fabricated in a piecemeal fashion from alien forms" (Foucault 1984a, p.78)

The goal of genealogy is therefore to reveal the true nature of a given event or practice by abandoning the search for an origin that is thought to present the event in its clearest form, and instead unveil in meticulous detail how the event that are studied has been fabricated from "different alien forms". As Foucault puts it:

"What is found at the historical beginning of things is not the inviolable identity of their origin; it is the dissension of other things. It is disparity".

That there is no grand origin to uncover, where things exist in their clearest form, also mean that there cannot be any truth for the genealogist. If there is indeed no origin where things exists in their clear and true form, if they instead are the results of combinations and changes of already existing forms, then the whole idea of a true nature of events or things disappears, because what is then their true form, if there is no pure form, i.e. origin, to uncover? This leads Foucault to dismiss the notion of truth.

So if there is no truth, and all events or things are the outcome of combinations or changes of already existing things, then it follows that it becomes the goal of the genealogist to uncover these combinations and changes of already existing things and events. And this leads back to the

description of genealogy as something that “operates on the field of entangled and confused parchments, on documents that have been scratched over and recopied many times” (Foucault 1984a, p.76). The aim of such analytical work thus becomes to investigate the “Herkunft” and “Entstehung”, descent and emergence, of things.

So instead of searching for the origin of things, the genealogist investigates the descent of things. By doing this he is able to uncover all the small accidents, changes, combinations etc. that caused the emergence of the things that exist. As Foucault puts it:

“Genealogy does not resemble the evolution of a species and does not map the density of a people. On the contrary, to follow the complex course of descent is to maintain passing events in their proper dispersion; it is to identify the accidents, the minute deviations – or conversely, the complete reversals – the errors, the false appraisals, and the faulty calculations that gave birth to those things that continue to exist and have value for us; it is to discover that truth or being does not lie at the root of what we know and what we are, but the exteriority of accidents.” (Foucault 1984a, p.81)

This relentless and gray investigation of the “herkunft” also implies that nothing in the world is constant. Everything is the outcome of accidents, calculations, changes, combinations etc. Even the notion of truth is not constant, although the long use of the term through history has made it into a concept which is difficult to dismiss. Foucault argues, borrowing from Nietzsche, that:

“Truth is undoubtedly the sort of error that cannot be refuted because it was hardened into an unalterable form in the long baking history of history” (Foucault 1984a, p.74)

This does not mean however, as mentioned earlier, that the genealogist should accept the notion of truth, or any other concepts or things, as being constant. On the contrary, Foucault underscores the importance of realizing that nothing is constant, quote:

“The search for descent is not the erecting of foundations: on the contrary, it disturbs what was previously considered immobile; it fragments what was thought unified; it shows the heterogeneity of what was imagined consistent with itself” (Foucault 1984a, p.82)

Even the body is not constant, which is an important point to realize for understanding Foucault’s later works:

“The body – and everything that touches it: diet, climate, and soil – is the domain of Herkunft. The body manifests the stigmata of past experience and also gives rise to desires, failings, and errors. These elements may join in a body where they achieve a sudden expression, but as often, their encounter is an engagement in which they efface each other, where the body becomes the pretext of their insurmountable conflict” (Foucault 1984a, p.83)

So these points, that there is no origin of things and that it is the task of the genealogist to trace how things came into being by tracing their descent, makes the concept of Entstehung, emergence, central. In other words: When do things start to exist if they have no origin? Firstly, Foucault underscores that, it is necessary not to think about the emergence as the final step of a development. This would be to do violence against the idea of descent and of things not being constant. This also explains why he earlier, in (Foucault 1972) argued that we should dismiss a whole set of notions which all deals with the theme of continuity, two of which being “development” and “evolution” in relation to which he argued:

“... they [DEVELOPMENT AND EVOLUTION] make it possible to group a succession of dispersed events, to link them to one and the same organizing principle, to subject them to the exemplary power of life (with its adaptations, its capacity for innovation the incessant corre-

lation of its different elements, its systems of assimilation and exchange), to discover, already at work in each beginning, a principle of coherence and the outline of a future unity, to master time through a perpetually reversible relation between an origin and a term that are never given, but always at work" (Foucault 1972, p.24)

Since genealogy holds that the origin, where things are pure, does not exist, it follows that things must emerge from a relationship between other things. The idea of the study of descent was exactly that the things that exist are outcomes of accidents etc. This leads to a focus upon struggle and forces for understanding the emergence of things. As Foucault puts it: "Emergence is always produced through a particular stage of forces" (Foucault 1984a, p.83). As examples illustrating what the emergence is Foucault explains, using quotes from Nietzsche's work, that:

"...It is in this sense that the emergence of a species (animal or human) and its solidification are secured "in an extended battle against conditions which are essential and constantly unfavorable." In fact, "the species must realize itself as a species, as something – characterized by the durability, uniformity, and simplicity of its form – which can prevail in the perpetual struggle against outsiders or the uprising of those it oppresses from within. On the other hand, individual differences emerge at another stage of the relationship of forces, when the species has become victorious and when it is no longer threatened from outside. In this condition, we find a struggle "of egoisms turned against each other, each bursting forth in a splintering of forces and a general striving for the sun and for the light.""(Foucault 1984a, p.84)

So the emergence is the point in time characterized by the entry of forces, as Foucault puts it:

"Emergence is thus the entry of forces: it is their eruption, the leap from the wings to center stage, each in their youthful strength." (Foucault 1984a, p.84)

The place of this entry is thereby a non-place and the descent explains the strength of the adversaries:

"As descent qualifies the strength or weakness of an instinct and its inscription on a body, emergence designates a place of confrontation, but not as a closed field offering the spectacle of a struggle among equals. Rather, as Nietzsche demonstrates in his analysis of good and evil, it is a "non-place", a pure distance, which indicates that the adversaries do not belong on a common space. Consequently, no one is responsible for an emergence; no one can glory it, since it always occurs in the interstice" (Foucault 1984a, p.85)

The fact that nothing in society is constant and that everything is the outcome of struggles lead to the conclusion that society does not evolve towards a better or a worse state. Society just develops through an endless line of struggles, from combat to combat, domination to domination:

"Humanity does not gradually progress from combat to combat until it arrives at universal reciprocity, where the rule of the law finally replaces warfare; humanity installs each of its violences in a system of rules and thus proceeds from domination to domination" (Foucault 1984a, p.85)

This is why Foucault argues that knowledge is just a tool in this perpetual struggle, when he says that, quote: "... knowledge is not made for understanding, it is made for cutting." (Foucault 1984a, p.88), which leads to the following argument in *Discipline and Punish*:

"Perhaps, too, we should abandon a whole tradition that allows us to imagine that knowledge can exist only where the power relations are suspended and that knowledge can develop only outside its injunctions, its demands and its interests. Perhaps we should abandon the belief that power makes mad and that, by the same token, the renunciation of power is one of the conditions of knowledge. We should admit rather that power produces knowledge

(and not simply by encouraging it because it serves power or by applying it because it is useful); that power and knowledge directly imply one another; that there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations." (Foucault 1991, p.27)

The core of genealogy is therefore not a search for the deep explanation of an event, an uncovering of an origin, neither a search for the meaning behind an event. On the contrary, genealogy seeks to illuminate the surface of events, and situate these events on a map among other events. By identifying the surface of events and placing these events upon a map, thereby showing the landscape formed by all the events, the genealogical method is capable of illuminating the relationship between events, hence illuminating the reason for them being as they are and thereby making deep explanations of the events unnecessary. As Foucault argued in an essay called "Nietzsche, Freud, Marx", here quoted from (Dreyfus & Rabinow 1983, p.106-107):

"Whereas the interpreter is obliged to go to the depth of things, like an excavator, the moment of interpretation [genealogy] is like an overview from higher and higher up, which allows the depth to be laid out in front of him in a more and more profound visibility; depth is resituated as an absolutely superficial secret" (Dreyfus & Rabinow 1983, p.107)

Since emergence designates a change in force relations it follows that an event must be defined as a change in force relations, or in other words, a change in power relations:

"An event, consequently, is not a decision, a treaty, a reign, or a battle, but the reversal of a relationship of forces, the usurpation of power, the appropriation of a vocabulary turned against those who had once used it, a feeble domination that poisons itself as it grows lax, the entry of a masked "other"." (Foucault 1984a, p.88)

Given that an event framed in this way is not a treaty, a battle or other 'things', but a change in force relations, we should think closely as to how to identify such changes. What is a "reversal of a relationship of force" then? How does it look? What should we look for in our analytical work to identify those? It seems to me that often this is the point where researchers leaves what I will call the Foucauldian approach and moves dangerously close to a simple perception of power as person A does something to person B, and simply traces who did what to whom, and maps this. A map of such actions however misses the point, because if we are to understand what a "reversal of a relationship of force" actually means, then we have to focus closely on the point which Foucault makes, when he argues that it is "the appropriation of a vocabulary turned against those who had once used it". We have thus, to identify such events analytically in relation to the changes in discourses.

In other words, we have to understand what discourses are, and how a change in those can be conceptualized, before we are able to fully understand the concept of an event in a genealogical perspective. And this is why we need to go back to some of the ideas developed in (Foucault 1972), because in this book Foucault developed, not a finished methodology, about how to identify discursive formations, but at least some ideas as to what they are and how we can conceptualize them. It should be noted, that I in relation to the status of (Foucault 1972) in which Foucault argues that his goal was to develop a method, agrees with (Raffnsøe, Gudmand-Høyer, & Thaning 2008) who make the point that it was actually not the goal of the book to develop a method, a point which Foucault also admitted himself later in an interview in 1987, which is cited in (Raffnsøe, Gudmand-Høyer, & Thaning 2008, p.181). I therefore use the book as a source of ideas about how to conceptualize events and discourses, which will make it possible to use genealogy in a way in which it is compatible with many of the ideas developed by Wenger.

Having now presented the core ideas in the genealogical method, and before going back to the archaeology, I will touch upon how Foucault used genealogy in practice, because this will make it easier to comprehend why the archaeology ideas are important.

Foucault uses the genealogical method in "Discipline and Punish" as well as volume one of "The history of Sexuality". I have touched upon his use of it in "Discipline and Punish", so let us now turn to "The history of Sexuality". In the first volume of the History of Sexuality Foucault uses the method again. This time, however, he elaborates explicitly upon his use of the method. Volume 1 of "The history of Sexuality" is both a book about sexuality on its own, as well as the first volume in a series of books which Foucault never finalized. In the first part of the book Foucault uses the genealogical method, in the same manner as he did it in "Discipline and Punish", by first presenting an event and thereafter analyzing how this event emerged and what the descent of it is. He starts the book by saying:

"For a long time, the story goes, we supported a Victorian regime, and we continue to be dominated by it even today. Thus the image of the imperial prude is emblazoned on our restrained, mute, and hypocritical sexuality." (Foucault 1998, p.3)

Foucault then presents the "repressive hypothesis", which holds that in Victorian times a silence was enforced by the powers in society. Sexuality was forced, the story goes, to be surrounded by silence. The sexuality of people, which they had earlier spoken quite openly about, was now repressed into silence. This meant that by speaking about sex people were able to resist, by talking about their sexuality people were placing themselves outside the power that was repressing their sexuality:

"If sex is repressed, that is, condemned to prohibition, nonexistence, and silence, then the mere fact that one is speaking about it has the appearance of a deliberate transgression. A person who holds forth in such language places himself to a certain extent outside the reach of power; he upsets established law; he somehow anticipates the coming freedom. This explains the solemnity with which one speaks of sex nowadays." (Foucault 1998, p.6)

This implied that a distinction existed between power and truth. Power was opposed to the truth. And this led to a 'will to knowledge', people would be trying harder and harder to speak the truth to place themselves outside the reach of power. Foucault thereafter asks:

"Why do we say, with so much passion and so much resentment against our most recent past, against our present, and against ourselves, that we are repressed? By what spiral did we come to affirm that sex is negated? What led us to show, ostentatiously, that sex is something we hide, to say it is something we silence? And we do all this by formulating the matter in the most explicit terms, by trying to reveal it in its most naked reality, by affirming it in the positivity of its power and its effect." (Foucault 1998, p.9)

Foucault's aim with his analysis therefore is:

"... to examine the case of a society which has been loudly castigating itself for its hypocrisy for more than a century, which speaks verbosely of its own silence, takes great pains to relate in detail the things it does not say, denounces the powers it exercises, and promises to liberate itself from the very laws that have made it function" (Foucault 1998, p.8)

He then criticizes the "repressive hypothesis", and investigates how it emerged, how the situation where people talk so much about their sexuality emerged. To understand this, he focuses upon the practices surrounding the confession. Why are people trying to tell the truth all the time, what lies behind this confessional practice? In undertaking this analysis he shows that to understand the confession, it is necessary to understand some relatively broader practices in

society. And this leads to his discussion about bio-power. It is worth to note the similarity to the method used in "Discipline and Punish" here, where he also identified a relatively broad dynamics in society, i.e. the emergence of disciplinary practices, as necessary to understand a relatively specific event, i.e. the disappearance of torture as a public spectacle.

To sum up, what Foucault does in the two books is to start with an analysis of the present situation, the prison or the will to talk about sexuality. After this is done he asks: how did we get here? He then traces the practices of punishment or confession back in time. After having done that, he is able to explain how the contemporary situation emerged, and hence to write the "history of the present" situation. This means that the focus on a contemporary issue, a current manifestation of power, such as the confession, guides the choices of what is relevant to study historically. He studies the historical issues that are relevant in understanding why confession became what it is today, or how torture as a public spectacle disappeared from punishment. Foucault remained rather silent upon why he chooses exactly these two specific practices for further analysis, and this is a problem since the choice of focus is of paramount importance.

One is therefore forced to deduce this from his writings. The question is therefore: How did Foucault come to the conclusion that it was exactly the investigation of confession as a practice, or the analysis of the disappearance of torture as a public spectacle, which held the key to the analyses? As I read his work the choice is based on his points about how we should perceive power and society, an issue which is a key part of the genealogy, which he develops in (Foucault 1991) and (Foucault 1998).

In part four, chapter two, of "the history of sexuality" Foucault writes about his method. Firstly he clarifies his goal, which was to "analyze certain forms of knowledge regarding sex... .. in terms of power" (Foucault 1998, p.92). Thereafter he argues that he needs to clarify some misunderstandings with regard to the nature, form and unity of power, and he thereafter begins to specify how he understands power.

"It seems to me that power must be understood in the first instance as the multiplicity of force relations immanent in the sphere in which they operate and which constitute their own organization; as the process which, through ceaseless struggles and confrontations, transformations, strengthens, or reverses them; as the support which these force relations find in one another, thus forming a chain or a system, or on the contrary, the disjunctions and contradictions which isolates them from one another; and lastly, as the strategies in which they take effect, whose general design or institutional crystallizations is embodied in the state apparatus, in the formulation of the law, in the various social hegemonies" (Foucault 1998, p.93)

As we see from the quote, power is understood as the configuration of force relations existing in society at a given point in time. As Foucault argues, this configuration is not constant through time, but change constantly through the struggles and combats taking place in society. The institutions, laws etc. existing in society are the manifestations of these configurations of force relations. It follows from the arguments in "Nietzsche, Genealogy, History" that Foucault is going to investigate how "certain forms of knowledge regarding sex" is produced in the configurations of force relations existing in society.

To understand an analysis of this knowledge creating process it is necessary for Foucault to elaborate upon the nature of power, which he does in the following part of the chapter on method. Firstly, he argues that power relations are always local and unstable. Unstable follows from the description of society in "Nietzsche, Genealogy, History" which is seen as moving from combat to combat, i.e. nothing is stable or constant, and local because force relations are everywhere. As Foucault moves on to argue, "Power is everywhere; not because it embraces every-

thing, but because it comes from everywhere" (Foucault 1998, p.93). The point is that power is not located certain places in society, such as in the king, the prime minister, in judges or in certain institutions. On the contrary force relations are to be found everywhere in society, and it is this configuration of force relations we may call power:

"...power is not an institution, and not a structure; neither is it a certain strength we are endowed with; it is the name that one attributes to a complex strategical situation in a particular society" (Foucault 1998, p.93)

Subsequently, Foucault presents a number of propositions regarding power. The first is that power is not something that can be possessed, since power is "... exercised from innumerable points, in the interplay of nonegalitarian and mobile relations" (Foucault 1998, p.94). In "Discipline and Punish" he argued the same, by saying:

"...power is exercised rather than possessed; it is not the 'privilege', acquired or preserved, of the dominant class, but the overall effect of its strategic positions – an effect that is manifested and sometimes extended by the position of those who are dominated." (Foucault 1991, p.26-27)

The second proposition is that power relations are not different from other types of relations, but they are immanent in such (Foucault 1998). This means that for example an economic relation or an organizational relation also constitute a power relation. The third proposition is that power comes from below. Power is not to be understood as a relative huge well-defined structure that defines society in all its detail; instead power is immanent in all types of relations, which constituting the small details of society, and it is from all these small power relations the huge structures in society emerges (Foucault 1998). The fourth proposition is that power relations are both intentional and non-subjective. Foucault argues:

"Power relations are both intentional and nonsubjective. If in fact they are intelligible, this is not because they are the effect of another instance that "explains" them, but rather because they are imbued, through and through, with calculation: there is no power that is exercised without a series of aims and objectives. But this does not mean that it results from the choice or decision of an individual subject; let us not look for the headquarters that presides over its rationality; neither the caste which governs, nor the groups which control the state apparatus, nor those who make the most important economic decisions direct the entire network of power that functions in a society (and makes *it* function); the rationality of power is characterized by tactics that are often quite explicit at the restricted level where they are inscribed (the local cynicism of power), tactics which, becoming connected to one another, attracting and propagating one another, but finding their base of support and their condition elsewhere, end by forming comprehensive systems: the logic is perfectly clear, the aims decipherable, and yet it is often the case that no one is there to have invented them, and few who can be said to have formulated them: an implicit characteristic of the great anonymous, almost unspoken strategies which coordinate the loquacious tactics whose "inventors" or decision makers are often without hypocrisy." (Foucault 1998, p.94-95, Original Italics)

The fifth proposition is that "Where there is power, there is resistance, and yet, or rather consequently, this resistance is never in a position of exteriority in relation to power" (Foucault 1998, p.95). There are power relations everywhere, as stated earlier, and there must be points of resistance for these to exist. Because if there is no resistance, then there is no relation, and then there can be no power relation. In other words just as power is immanent in all types of relations, economic, organizational, legal etc., so are points of resistance. As Foucault argues:

"Just as the network of power relations ends by forming a dense web that passes through apparatuses and institutions, without being exactly localized in them, so too the swarm of points of resistance traverses social stratifications and individual unities. And it is doubtless

the strategic codification of these points of resistance that makes a revolution possible, somewhat similar to the way in which the state relies on the institutional integration of power relationships" (Foucault 1998, p.96)

As seen from the quote it is the relationship between configuration of power relations and the configuration of points of resistance that makes dynamics occur in society. As we learned from the essay "Nietzsche, Genealogy, History", an event is when relationships of force change, which happens, when the configuration of power relations and points of resistance in society change. This is also the point where Foucault goes further back than Nietzsche and draws on (Machiavelli 2005)'s work. As we saw before, power is something that is enacted and not something which is possessed according to Foucault. Machiavelli saw this to, and used this observation in constructing his famous advice to the prince. This is, as (Clegg 1989) argues, what distinguishes Machiavelli, and later Foucault, from several other theorists who have founded their work on the ideas of Thomas Hobbes, who understood power as something which was possessed and located in specific persons or located in specific centres. Foucault takes the ideas of (Machiavelli 2005) a step further when he sees power relations as non-subjective. This means that whereas Machiavelli saw it as the objective of the prince to configure power relations in a way so that he would maintain power, Foucault does not see the configuration of certain power relations as reflecting the work of specific persons. This means that when analyzing power relations one should not, according to Foucault, analyze them by analyzing who has configured them and what their rationales were. In other words, one should not look toward the prince and his rationales. Rather, one should analyze the configurations of power relations on their own terms, this means, analyzing the strategy that the configuration of power relations constitute. Foucault says the following:

"It is in this sphere of force relations that we must try to analyze the mechanisms of power. In this way we will escape from the system of Law-and-Sovereign which has captivated political thought for such a long time. And if it is true that Machiavelli was among the few – and this no doubt was the scandal of his "cynicism" – who conceived the power of the prince in terms of force relationships, perhaps we need to go one step further, do without the persona of the Prince, and decipher power mechanisms on the basis of a strategy that is immanent in force relationships" (Foucault 1998, p.97)

After having made these proposition about power Foucault moved on to rephrase his research question. He does this by first given examples of how not to formulate the question, given what he has just stated about power.

"... the question that we must address, then, is not: Given a specific state structure, how and why is it that power needs to establish a knowledge of sex? Neither is the question: What over-all domination was served by the concern, evidenced since the eighteenth century, to produce true discourses on sex? Nor is it: What law presided over both the regularity of sexual behavior and the conformity of what was said about it?" (Foucault 1998, p.97)

Foucault thereafter gives examples of the "right" questions to ask. What characterizes these is that they conceive of power in a way which is in accordance with the notion of force relations found in "Nietzsche, Genealogy, History" as well as with the propositions about power presented earlier in the book:

"It is rather: In a specific type of discourse on sex, in a specific form of extortion of truth, appearing historically in specific places (around the child's body, apropos of women's sex, in connection with practices restricting births, and so on), what were the most immediate, the most local power relations at work? How did they make possible these kinds of discourses and conversely, how were these discourses used to support power relations? How was the actions of these power relations modified by their very exercise, entailing a strengthening of some terms and a weakening of others, with effects of resistance and counterinvestments, so

that there has never existed one type of stable subjugation, given once and for all? How were these power relations linked to one another according to the logic of a great strategy, which in retrospect takes on the aspect of a unitary and voluntarist politics of sex?" (Foucault 1998, p.97)

To answer these questions Foucault then poses four rules to follow, and makes it clear that these are preliminary rules, "...not intended as methodological imperatives; at most they are cautionary prescriptions" (Foucault 1998, p.98). These rules build upon the ideas already mentioned in relation to the genealogical method, but take it one step further.

The first rule is the "Rule of immanence". This rule builds on the ideas developed in relation to genealogy, when Foucault dealt with the relationship between power and knowledge. The point is that there is no discourse outside the reach of power. There is no knowledge of sexuality which can be discovered if the sexuality is freed from the influence of power. Foucault argues:

"One must not suppose that there exists a certain sphere of sexuality that would be the legitimate concern of a free and disinterested scientific inquiry were it not the object of mechanisms of prohibition brought to bear by the economic or ideological requirements of power" (Foucault 1998, p.98)

He then argues that it was only possible to investigate sexuality because it had been constituted as an object by relations of power, and in turn, power was only capable of making it an object because of the discourses and knowledge around the object. So we have power and knowledge engaging in a relationship where they come together to constitute the objects we see. Objects are formed through power and knowledge, and power and knowledge cannot exist without the subject. This is why Foucault argues:

"Between techniques of knowledge and power there, there is no exteriority, even if they have specific roles and are linked together on the basis of their difference" (Foucault 1998, p.98)

The first step of the analysis therefore becomes to start with what Foucault calls "'local centres' of power-knowledge" (Foucault 1998, p.98). These are the relationships, linking objects, knowledge and practices, which together constitute the "local centre" of power-knowledge we study. As an example Foucault mentions the objects and relations forming the web around the body of the child in relation to sexuality:

"Similarly, the body of the child, under surveillance, surrounded in his cradle, his bed, or his room by an entire watch-crew of parents, nurses, servants, educators, and doctors, all attentive to the last manifestation of his sex, has constituted, particularly since the eighteenth century, another "local center" of power-knowledge." (Foucault 1998, p.98)

The second rule is the "rule of continual variations". The point in this rule is that we should not try to analyze who has power and who has not power. This links back to the point I touched upon earlier, that we should not understand power as something possessed. Therefore we should rather analyse the network formed by relations of power and knowledge:

"We must seek rather the pattern of the modification which the relationships of force imply by the very nature of their process" (Foucault 1998, p.99)

Foucault then argues also, that this network is not constant, but always changing. This is also, as I shall return to, why I need to go back to some of the ideas developed in the archaeology to be able to identify the network of power-knowledge relations which are relevant for a given study, though ideas developed in relation to discursive formations. In other words, the archaeology is necessary, I will argue, to be able to identify the relations of power knowledge which are rele-

vant for a given study. The third rule is called “Rule of double conditioning”. In relation to this Foucault proclaims:

“No “local center,” no “pattern of transformation”, could function is, through a series of sequences, it did not eventually enter into an over-all strategy. And inversely, no strategy could achieve comprehensive effects, if did not gain support from precise and tenuous relations serving, not as its point of application or final outcome, but as its prop and anchor point” (Foucault 1998, p. 99)

This is a point which is important when I come to the issue of relating Foucault’s ideas with the ones by Wenger, because, what Foucault deals with here is the relationship between different power-knowledge centres and an overall pattern. Foucault argues to exemplify this rule:

“Thus the father in the family is not the “representative” of the sovereign or the state; and the latter are not projections of the father on a different scale. The family does not duplicate society, just as society does not imitate the family. But the family organization, precisely to the extent that it was insular and heteromorphous with respect to the other power mechanisms, was used to support the great “maneuvers” employed by the Malthusian control of the birthrate, for the populationist incitements, for the medicalization of sex and the psychiatrization of its nongenital form” (Foucault 1998, p.100)

Thus, we have the idea of a group of small networks of power relations, constituted by the family with the father figure, mother, children, and the mass of such small networks of power-knowledge becomes parts of a larger network, the society. And it is the tactics found in the families on the small scale which comes together at larger scales and makes possible strategies of population control for example, at the scale of society. We have to see in the network of power relations in other words an issue of scale. This links back to the point made earlier, that if we see structures emerging from the net of power relations which makes sense, then it is only because these power relations are imbued with calculation at the micro levels, by actors with specific goals. Family, with specific relations constituting it, is a part of a society with dynamics operating at macro level. The family does not exist without society, and vice versa. We may think of this third rule in another way, as the presence of similar condensations of power relations within specific places in society. We have all the families constituting condensations of power relations of a similar type, and from this mass of families in society, from the mass of small condensations rises larger structures, larger strategies such as birth control, which are only made possible by the families although they are not reducible to the families.

It is a similar point I will advance later, when I argue, that communities of practice within an organization constitute in themselves a network of power-knowledge relations, and together they constitute an organization, a constellation of communities, and the functioning of the organization is not reducible to the functioning of the communities of practice, but on the other hand, the communities cannot exist without the organization either. We can therefore not conceptualize the communities of practice containing specific power-knowledge relations, without relation to the larger network of relations between the communities, the organization, of which the communities of practice are part, and which at the same time only exist due to the communities of practice. This is what is lacking in Wenger’s theory, the focus upon the larger structures which people, objects and practices within COPs are part of. (Wenger 1998) touches upon the existence of communities of practice outside the one of claims processors which he study in his discussion about the relation between some claims processors and management within the insurance firm, but he keeps his analysis at the boundary of his community of practice, focusing only on the boundary processes. I want to fully take the step conceptually and argue, that if we are to understand how MNC entry changes organizations within cluster, and also the clusters themselves, then a focus on boundary processes and boundary objects is not relevant, focus has

to be on the larger structures, the part of the scale where the communities comes together and constitute the organization or the cluster. The focus should, in other words, not be on the communities alone, but on the structures they are part of, and which they themselves also constitute. One cannot in fact, conceptualize the community of practice without at the same time conceptualizing what context it is located in, and one have to make this context the central part of the analysis to fully understand how power-knowledge relations shape the subjects within COPs. I here use the terms people, objects and practices within COPs to underscore, that COPs are not only the members of such, a COP is, as Wenger describes it in his writings, something which we should understand broader, it includes objects, see for example the discussion on boundary objects in (Wenger 1998), as well as the practices, remember that what constitute a COP is different joint enterprise, mutual engagement and shared repertoire.

The fourth rule is the “rule of the tactical polyvalence of discourses” (Foucault 1998, p.100). The point of this rule is that there is no difference between discourse on the one hand and power and knowledge on the other; it is in the discourse that power and knowledge are joined together. This means that a discourse is not stable; it is always changing as relations within shift and form new configurations of power and knowledge. Foucault explains:

“... it is in discourse that power and knowledge are joined together. And for this very reason, we must conceive discourse as a series of discontinuous segments whose tactical function is neither uniform nor stable. To be more precise, we must not imagine a world of discourse divided between accepted discourse and excluded discourse, or between the dominant discourse and the dominated one; but as a multiplicity of discursive elements that can come into play in various strategies” (Foucault 1998, p.100)

In this rule the relationship to the ideas about what discursive formations are, and how they can be conceptualized in the archaeology, becomes important. As I will discuss later Foucault presents some elaborate ideas as to how we can perceive the concept of discourse and discourse formation, and when we look at them it becomes clear what Foucault means when he argues:

“Discourses are not once and for all subservient to power or raised up against it, any more than silence are. We must make allowance for the complex and unstable process whereby discourse can be both an instrument and an effect of power, but also a hindrance, a stumbling-block, a point of resistance and a starting point for an opposing strategy. Discourse transmits and produces power; it reinforces it, but also undermines and exposes it, renders it fragile and makes it possible to thwart it.” (Foucault 1998, p.101)

It is described in (Foucault 1972) how a discursive formation can be conceptualized as relationships between different ‘things’. These things can be words, concepts, behavioural patterns and hence also practices. What Foucault argues here, is thus that power and knowledge are imbued in the fabrics of a discursive formation, because they seep through the relations. They constitute the relations so to say; there cannot be any relations without both power and knowledge. And thereby an image of the relationship between discourse and practice, power and knowledge begins to emerge conceptually in Foucault’s works. Power-knowledge exist in every relation between practices, things, people which in turn constitute the networks which are discourses. And this is the conceptual relationship I will utilize later when I discuss this conceptualization with Wenger’s ideas. It also follows from this view upon power in relation to discourse that there cannot be any discourse on power which is oppressing another discourse, since the power-knowledge issue is internal to the discourse:

“There is not, on the one side, a discourse of power, and opposite it, another discourse that runs counter to it. Discourses are tactical elements or blocks operating in the field of force relations; there can exist different and even contradictory discourses within the same strat-

egy; they can, on the contrary, circulate without changing their form from one strategy to another, opposing strategy." (Foucault 1998, p.101-102)

Having now presented these four methodological rules I find it necessary to go back to the archeology of knowledge to look at some of the ideas developed in relation to discourse to construct a more elaborate understanding of this concept. What I am aiming for is especially to elaborate on, first, the relationship between discourse and practice, thereby erecting a better foundation for a discussion of the relationship between Foucault's ideas and Wenger's ideas, second, to elaborate upon the issue of how to identify and delimit discursive formations. Whereas Foucault's throughout most of his authorship to some extent has dealt with issues of change, and how to conceptualize and identify change, I find that *The Archaeology of Knowledge* holds important insights about how to identify the interior of the discursive formations, or 'plates' metaphorically, between which changes, or ruptures metaphorically, occur.

3.3 Archaeology

"... Discourses is not life, its time is not your time, in it, you will not be reconciled to death, you may have killed God beneath the weight of all that you have said; but don't imagine that, with all that you are saying, you will make a man that will live longer than he" (Foucault 1972, p.232)

This last line from (Foucault 1972) sums up what the book is about, which is, shortly put: discourses, and the birth, life and death of them. It is about how in society some discourses emerge, and have important implications for society, and then they disappear again. Underneath the analysis in the book, lies a largely implicit assumption, that society is not constant, and it can be conceptualized as Foucault later did explicitly in the essay "Nietzsche, Genealogy, History" which I presented earlier. In the beginning of (Foucault 1972), Foucault argues that we must rid ourselves of a line of notions, all of which implies a form of continuity, and these are: tradition, influence, development, evolution and spirit, because as he argues:

"We must question those ready-made syntheses, those groupings that we normally accept before any examination, those links whose validity is recognized from the outset; we must oust those forms and obscure forces by which we usually link the discourse of one man with that of another; they must be driven out from the darkness in which they reign. And instead of according them unqualified, spontaneous value, we must accept, in the name of methodological rigour, that, in the first instance, they concern only a population of dispersed events" (Foucault 1972, p.24)

There is no origin, no truth, no beginning or end, only a perpetual struggle. The question thus becomes for Foucault: how can certain structures, in the form of discourses emerge and shape society for a time, before they disappear again, for example the notion of God with all that it brings. Or, what does it actually bring? What is such a structure, how can we conceptualize it and analyze it? Or is it indeed structures, Foucault uses the term "constraints" in setting out his goal for (Foucault 1972), which can be seen as a work building on all his earlier works:

"At this point there emerges an enterprise of which my earlier books *Historie de la folie* (Madness and Civilization), *Naissance de la Clinique*, and *Les Mots et les choses* (The Order of Things) were a very imperfect sketch. An enterprise by which one tries to measure the mutations that operate in general in the field of history; an enterprise in which the methods, limits, and themes proper to the history of ideas are questioned; an enterprise by which one tries to throw off the last anthropological constraints; an enterprise that wishes, in return, to reveal how these constraints could come about" (Foucault 1972, p.16)

It is important not to read (Foucault 1972) as a book presenting a finished methodology. I agree with (Raffnsøe, Gudmand-Høyer, & Thaning 2008) who argue, that the goal of the book for Foucault was to describe in detail the concept of discourse he had used in his previous books, and therefore the book becomes abstract and unintelligible, if it is read on its own, which is also a misunderstanding to do. One has to look at the book as a contribution in which Foucault discusses some of the ideas he has been working with in his earlier books, but also, I would argue, as a book in which certain ideas are developed which lie implicitly underneath much of his work with genealogy.

When I first started reading genealogy, I did not think that I needed to go back to the archaeology. Having read (Dreyfus & Rabinow 1983) I thought that the book was a dead end for Foucault, and a project he abandoned as he turned to the genealogy, a thought which was only made stronger by (Flyvbjerg 1998a; Flyvbjerg 2001)'s argument that practice is more important than discourse. But then I realised that some of the ideas in genealogy seemed to be missing something. Although they were "deep", complex and difficult to comprehend, they were also difficult to apply in analytical work without "something more", and this "something more" I found in *The Archaeology of Knowledge*.

What I found was ideas and discussions which helped me to understand some of the relationships I had been uncertain about, which was: what is the relationship between practice and discourse?; how does one analytically identify the events or discourses belonging to a certain "study", i.e. when one wants to apply the ideas analytically, how does one then identify the necessary events or discourses one needs to study? This last question comes back to the issue I raised earlier, which was, how did Foucault identify the disappearance of torture as the key to understanding the birth of the prison as we know it? And similarity, how did he identify the confession as the key in relation to the issue of sexuality in society?

How does (Foucault 1972) help us to understand the relationship between discourse and practice? To understand this we need to focus on what a discourse is. Foucault does, as (O'Farrell 2005) also mentions, use the term discourses in different ways throughout his authorship, but I will take as my point of departure the writings in *The Archaeology of Knowledge* (Foucault 1972) because I find his ideas in this book can clarify some of the issues which emerges when he uses the term in relation to genealogy later in his authorship, and can make the application of the concept in analytical work easier.

As mentioned earlier Foucault starts the book by dismissing a set of notions, because they in some way imply a theme of continuity or development from one state to another. These are: tradition, influence, development, evolution and spirit. The problem of continuity is also raised in the discussion which follows where Foucault dismisses the notion of an 'oeuvre', the idea that we can group a number of texts using the fact that they are all written by the same author. It should be noted that Foucault here draws on one of his earlier discussions found in his essay "What is an Author" (Foucault 1984b). Having dismissed the notions of continuity and the author as something unifying what is said, Foucault arrives at the analytical object: the discourse. And then he makes it clear that the discourse is not to be analyzed as the reflection of some underlying structures, or some distant origins, they must instead be treated as the origin, when they occur:

"We must be ready to receive every moment of discourse in its sudden eruption; in that punctuality in which it appears, and in that temporal dispersion that enables it to be repeated, known, forgotten, transformed, utterly erased, and hidden, far from all view, in the dust of books. Discourse must not be referred to the distant presence of the origin, but treated as and when it occurs" (Foucault 1972, p.28)

So discourses are to be analyzed at face value when they occur, and importantly in the “temporal dispersion” in which they occur. Discourses are therefore nothing on their own, and they cannot be grouped by the standard ways of doing so, i.e. through the notion of an author, or development or any of the other notions which Foucault dismissed. The way in which they relate to each other thereby become the objective of the analysis, as Foucault argues:

“One is led therefore to the project of a pure description of discursive events as the horizon for the search for the unities that form within it” (Foucault 1972, p.29-30)

When the objective is to analyze this surface, the question becomes according to Foucault, why one statement appeared rather than another. The issue is, in other words, not to identify and categorize what is actually said, the statement, but the relationship between the statements that is said, to identify what makes it possible that exactly “this” and nothing else is said. It should be noted that later in the book Foucault returns to the concept of a statement and describes it as follow:

“The statement is not therefore a structure (that is, a group of relations between variable elements, thus authorizing a possibly infinite number of concrete models); it is a function of existence that properly belongs to signs and of the basis of which one may then decide, through analysis or intuition, whether or not they ‘make sense’, according to what rule they follow one another or are juxtaposed, of what they are the sign, and what sort of act is carried out by their formulation (oral or written)” (Foucault 1972, p.97)

And here we start seeing the link to the later work, or to the logic underlying all of Foucault work, to use another word, and this is the issue of power-knowledge. The question becomes what relations of power-knowledge that made the appearance of one statement rather than another possible. To conceptualize this Foucault developed the notion of a discursive formation, and in this concept he focuses on the dispersion of discursive events:

“Such an analysis would not try to isolate small islands of coherence in order to describe their internal structure; it would not try to suspect and to reveal latent conflicts; it would study forms of division. Or again: instead of reconstructing *chains of inference* (as one often does in the history of the science or of philosophy), instead of drawing up *tables of differences* (as the linguists do), it would describe *systems of dispersion*.” (Foucault 1972, p.41 Original Italics)

The definition of a discursive formation therefore becomes:

“Whenever one can describe, between a number of statements, such a system of dispersion, whenever, between objects, types of statement, concepts, or thematic choices, one can define a regularity (an order, correlations, positions and functionings, transformations), we will say, for sake of convenience, that we are dealing with a *discursive formation*” (Foucault 1972, p.41-42)

What Foucault then becomes interested in is the so-called “rules of formation”, which are the conditions of existence of the formation. It is, in other words, the relationships found within the dispersion of statements which constitute the formation.

It seems clear from the description page 44-45 in (Foucault 1972), where Foucault gives examples of so-called “objects of discourse”, that such objects are not only words, it is in fact also the name given to practices, something done physically, such as crimes. This means that we should understand the relationship between discourses and practices as a non-polarized one. A practice which exists, and are referred to in a specific way, using a specific word, be that R&D work, for

example, must also be understood as a discursive element. Foucault's conclusion in relation to objects of discourse is thus:

"One might say, then, that a discursive formation is defined (as far as its objects are concerned, at least) if one can establish such a group; if one can show how any particular object of discourse finds in it its place and law of emergence; if one can show that it may give birth simultaneously or successively to mutually exclusive objects, without having to modify itself." (Foucault 1972, p.49)

A discursive object exist under the, quote "positive conditions of a complex group of relations"(Foucault 1972, p.49). These relations are not found within the object, but between the object and other objects, and these relations can be between for example, quote "institutions, economic and social processes, behavioural patterns, systems of norms, techniques, types of classification, modes of characterization" (Foucault 1972, p.49). The important issue to note as to the nature of such relations is, that this is the relations which makes the existence of the object possible:

"... these relations are not present in the object; it is not they that are deployed when the object is being analyzed; they do not indicate the web, the immanent rationality, that ideal nerve that reappears totally or in part when one conceives of the object in the truth of its concept. They do not define its internal constitution, but what enables it to appear, to juxtapose itself with other objects, to situate itself in relation to them, to define its difference, its irreducibility, and even perhaps its heterogeneity, in short, to be placed in a field of exteriority" (Foucault 1972, p.50)

The point about behavioral patterns links directly physical practices to the discourse. This means that what people does physically, their practices, also can become embedded as an object in a discursive formation. In relation to the issue of companies and clusters this also mean that the physical work, the R&D work, the construction of mobile phones, PCBs, time schedules etc, all physical entities or behavioral patterns, practices, can also become part of relationships through the existence of which discursive formations are formed. They are thus not detached from the discourses, and they are at the same time not parts of it.

This means that throughout society physical practices, behavioral patterns, institutions, concepts, statements and other objects are linked through relations, and these relations, the webs they form, imbued with power-knowledge relations, are in turn what makes the existence of these specific objects of discourse possible. There is therefore no distinction between the two, they exist in a mutual relationship where the existence of one is a prerequisite for the existence of the other and vice versa, and this is why Foucault later argues:

"These relations characterize not the language (langue) used by discourse, nor the circumstances in which it is deployed, but discourse itself as a practice" (Foucault 1972, p.51)

Since society is always changing, the discursive objects which are formed are not constant but their unity and the relationship between them can only be gasped through an analysis of the relations:

"What, in short, we wish to do is to dispense with 'things'. To 'depresentify' them. To conjure up their rich, heavy, immediate plentitude, which we usually regard as the primitive law of a discourse that has become divorced from it through error, oblivion, illusion, ignorance, or the inertia of beliefs and traditions, or even the perhaps unconscious desire not to see and not to speak. To substitute for the emerging treasure of 'things' anterior to discourse, the regular formation of objects that emerge only in discourse. To define these objects without reference to the ground, the foundation of things, but by relating them to the body of rules

that enable them to form as objects of a discourse and thus constitute the conditions of their historical appearance" (Foucault 1972, p.52)

Physical things, behavioral patterns, etc., thus becomes suspended in the analysis, but are still part of it, because they are included through the role they play in constituting the relationships in which the discursive objects we study emerge. Physical things thus become relevant for the analysis in as far as they contribute to our understanding of the discursive objects which exist, and why it is exactly these and not other objects that exist. Later in the book Foucault underscores that it is not the things, nor the words, which are the focus, it is the relationships they form which is the focus. And in relation to this he also dismisses attempts to understand why specific words are spoken by analyzing the subject.

"Thus conceived, discourse is not the majestically unfolding manifestation of a thinking, knowing, speaking subject, but, on the contrary, a totality, in which the dispersion of the subject and his discontinuity with himself may be determined. It is a space of exteriority in which a network of distinct sites is employed. I showed earlier that it was neither by 'words' nor by 'things' that the regulation of the objects proper to a discursive formation should be defined; similarly, it must now be recognized that it is neither by recourse to a transcendental subject nor by recourse to a psychological subjectivity that the regulation of its enunciation should be defined." (Foucault 1972, p.60-61)

This does not mean, as I read it in relation to Wenger, that we should not focus on why subjects say what they say. This is the conclusion which (Jørgensen 2007) apparently draws, when he argues that a Foucauldian analysis will not aim at understanding how members of a community learn to be part of such, which I will discuss later, which must also include saying the same things as other members, i.e. having a shared repertoire in Wegner's framing. But this is mistaken, because I believe that we have to read Foucault's text in a way, where it is the relations which shape the behavior of subjects which are relevant. This means that a focus on the relations which causes specific behavioral patterns of people in a community of practice, and hence also how they interact, is relevant.

To understand how to identify these relationships that form discursive formations, and hence to be able to delimit one's study, we have to focus on what Foucault writes about strategies. As examples of strategies he mentions economics, medicine, grammar and the science of living beings:

"...a theory, in nineteenth-century philology, a kinship between all the Indo-European languages, and of an archaic idiom that served as a common starting-point; a theme, in the eighteenth century, of an evolution of the species deploying in time the continuity of nature, and explaining the present gaps in the taxonomic table; a theory, propounded by the Physiocrats, of a circulation of wealth on the basis of agricultural production. Whatever their formal level may be, I shall call these themes and theories 'strategies'." (Foucault 1972, p.71)

In the discussion of strategies, Foucault presents three points. Firstly, one has to study the "points of diffraction", "points of equivalence" and "link points of systematization". The argument is that statements which are incompatible may be part of the same discourse, because they emerge from the same rules, i.e. some of the same power-knowledge relations. This makes Foucault able to group theories, which are normally treated as different, under the same discourse in his analysis. Secondly, one has to study the "economy of the discursive constellation". Here the point is the issue of determining the relationships which make some statements occur, and hence the issue relates to the power-knowledge issue of the relationships within the discourse, as touched upon earlier. Thirdly, one has to study the relationship between discourse and practice:

"The determination of the theoretical choices that were actually made is also dependent upon another authority. This authority is characterized first by the *function* that the discourse under study must carry out in the *field of non-discursive practice*. This General Grammar played a role in pedagogic practice; in a much more obvious, and much more important way, the Analysis of Wealth played a role not only in the political and economic decisions of governments, but in the scarcely conceptualized, scarcely theorized, daily practices of emergent capitalism, and in the social and political struggles that characterized the Classical period." (Foucault 1972, p.75)

The point here is clearly that discourse is also linked to practice, as stated earlier. It is impossible to conceptualize discourse without practice, i.e. without including in the analyses the relations to physical objects as well as to practices in society, and as such also what has earlier been termed behavioral patterns. On the issue of how to identify a discursive formation, using the idea of strategies, and relations, Foucault thus argues:

"A discursive formation will be individualized if one can define the system of formation of the different strategies that are deployed in it; in other words, if one can show how they all derive (in spite of their sometimes extreme diversity, and in spite of their dispersion in time) from the same set of relations" (Foucault 1972, p.76)

It also follows according to Foucault that discursive objects are not constant, it is always in change, and this change does not come from within, but from its frontiers, at the limits of the "specific rules" which marks its existence. And rules must in this regard be understood as the relationships causing the existence of the discourse. Changes come from within the system but at the same time at the boundary. It is the changes in relation between the objects happening at the same time and in relation to changes in other discursive formation, and thus the interactions and mutual impacts, and changes, of relations within and outside the discursive formation. Thus changes of the very relations which make the discursive formation what it is:

"... These systems of formation must not be taken as blocks of immobility, static forms that are imposed on discourse from the outside, and that define once and for all its characteristics and possibilities. They are not constraints whose origin is to be found in the thoughts of men, or in the play of their representations; but nor are they determinations which, formed at the level of institutions, or social or economic relations, transcribe themselves by force on the surface of discourses. These systems - I repeat - resides in discourse itself; or rather (since we are concerned not with its interiority and what it may contain, but with its specific existence and with its conditions) on its frontiers, at that limit at which the specific rules that enables it to exist as such are defined." (Foucault 1972, p.82)

Having now presented this view of discursive formations, and thereby the points from Foucault's works on genealogy and archaeology which I will combine with the work of Flyvbjerg in chapter 4 to develop the analytical framework for the case study in this thesis, I find it is time to discuss the difference between Wenger and Foucault to end this chapter. The rationality for this structure is that I, with the previous discussion of Foucault's work as my point of departure now will clarify what Foucault captured with his methods that Wenger does not capture, and after this discussion I will leave Wenger behind, and focus on operationalizing Foucault's works by combining them with Flyvbjerg's work in the next chapter, chapter 5.

3.4 The difference between Wenger and Foucault

In the previous sections I presented the genealogical and the archaeological method, that Foucault developed, and before operationalizing them into the analytical framework for the case study in this thesis, I will discuss what these methods can be used to capture, which Wenger's theory is not capable of illuminating. In order to do this I will critically discuss Wenger's theory

using Foucault's works. In this critical reading I will argue that Foucault and Wenger actually are relatively compatible, but have different focuses. I will further argue that given this difference in focus, a Foucauldian approach to the case study is a better choice than a Wengerian approach, given the objective of understanding how MNCs acquisitions influence the dynamics within cluster.

We saw in the previous section that Foucault placed his focus on the issue of power. Wenger himself admitted his lack of focus on power relations in the now classical publications (Lave & Wenger 1991; Wenger 1998), and stated that it would be up to future researcher to fill in this gap. Instead of taking up this challenge himself it seem, that he has chosen a path in which he has increasingly ignored the issue of power in relation to COP. One can speculate whether this has been a strategy to make the COP theory more widespread in the management literature, in which some of the more soft discussions within the classical COP literature are ignored.

I will therefore start the review with what I see as a contribution from Wenger aimed at managers, and a contribution in which the softer sides of the COP, especially the power issue is played down. This is a pedagogical step, which I hope will make it easier for the reader to see what is relatively under conceptualized in the COP framework, compared to the works of Foucault. After having highlighted this through a COP article specifically aimed at managers, I will go back to the classical contributions on COPs and use these to elaborate on the discussion and make a detailed argument.

In (Wenger & Snyder 2000), it is explained briefly what a communities of practice (COP) is all about, and the argument goes:

"What are communities of practice? In brief, they're groups of people informally bound together by shared expertise and passion for a joint-enterprise – engineers engaged in deep-water drilling, for example, consultants who specialize in strategic marketing, or frontline managers in charge of check processing at a large commercial bank. Some communities of practice meet regularly – for lunch on Thursdays, say. Others are connected primarily by e-mail networks. A community of practice may or may not have an explicit agenda on a given week, and even if it does, it may not follow the agenda closely. Inevitably, however, people in communities of practice share their experiences and knowledge in free-flowing, creative ways that foster new approaches to problems" (Wenger & Snyder 2000, p.139-140)

According to this, COP's is about informally bound groups of people who interact and create new knowledge. They are bound together by a joint enterprise, they may meet face-to-face or virtually and the meetings may be more or less formalized. This simple view builds on the more elaborate arguments presented in (Lave & Wenger 1991; Wenger 1998) which I shall return to later. Companies can according to (Brown & Duguid 2000a) be understood as made up of communities with different practices. I agree with this, that we can perceive an organization as a collection of COPs centred on different tasks. Further, (Brown & Duguid 2000a) argued, as mentioned earlier, that clusters can be understood as networks of communities of practice.

However, I believe that the issue of how power shapes organizations has to be elaborated before the concept of "firms as constellations of practice" or "clusters as networks of practice" will be applicable to my objective. Let me use the remainder of this section to illustrate where the COP concept falls short in this regard.

The picture drawn of people coming together over a mutual passion, pursuing this passion and thereby breaking new ground, creating new knowledge and new breakthroughs, enhancing the competitiveness of firms, all seems rather jolly. However, we should not forget that organizations would be a rather interesting place, if everybody was purely focusing on their own pas-

sions. We would maybe see the deep-water drilling engineers, mentioned above, drilling pointlessly in different directions taking their technology to the edge, experiencing the thrills of doing drilling so technically challenging that the world has never seen anything like it, while not consulting the geologists to get information on where the oil is to be found. The geologists would, anyway, also be pursuing their passion, mapping previously unknown pockets of oil, conduction state of the art analyses of drill-cores, refining practices in their field etc. On top of this, the consultants engaged in the company would be busy making benchmark analyses, strategic roadmaps, etc. You get the picture – something is missing. And this something is what binds the COP together, something which aligns the direction of the learning within the communities, so that it is useful for the organization.

I am not claiming here, that there is indeed something steering learning in organizations so that it occurs in a rational direction. I am well aware that organizations should not be understood as rational actors; instead they should be seen as the result of the actions of all the individuals coming together in them, pursuing different personal goals etc., as argued in for example the literature on MNCs as social constructions. The point I want to make is that if we understand an organization as a constellation of COP's then we also need to focus on the power relations shaping learning in these COPs, or in other words, how learning within different COPs within the organization impact learning within other COPs and vice versa. Or, let me rephrase this, all the learning should not necessarily be useful for the organization understood as a constellation as COP's, but something must exist, so that the COPs are bound together by "something" which can be called a constellation – and that "something" is what I believe is relations of knowledge and power, or to use Foucault's term, power-knowledge relations. Let me underscore this, relations of knowledge, i.e. knowledge diffusion between different COPs is one side of the coin, in my view, and this is where Wenger indeed has his focus, i.e. on the learning and knowledge occurring in and between COP's, but the other side of the coin is power relations, when we focus on organizations as constellations of COPs.

To make the point more clear, let me turn to an interesting point also raised by (Wenger & Snyder 2000): why are COPs not more widespread if they are so valuable to the knowledge production within firms? (Wenger & Snyder 2000) list three reasons for this; firstly, that although COPs have been around for centuries, in the form of people coming together over a joint passion, etc., it wasn't until the 1990's that the term "Community of Practice" entered the business world. Secondly, according to (Wenger & Snyder 2000), only a couple of firms had taken up the idea of COPs and their value and started "installing"³ and nurturing them. Thirdly, COPs, given their informal structure and organic growth fuelled by the passion of the members makes it difficult to incorporate COPs into an organizational structure.

The two last points are important for my objective, because they both relate to the same dilemma facing the COP literature, which is: How can COPs, which can be informal, which can be self-organizing, which can grow uncontrolled fuelled by the passion of its members, which can cross structural boundaries within a firm, and even cross the boundaries of a firm, be conceptualized as fitting into an organization? If everything is dynamics and uncontrollable, how do we make sense of an organization consisting of a constellation of COPs, or even more important, why do huge organizations not fall into a deep chaotic state?

If we accept the idea that organization are constellation of COPs then we need to elaborate theoretically on the structures when gives such organizations structure and direction, so to say. We need to elaborate on the power relations. And power relations do exist in organizations.

³ "Installing" is here put in quotation marks, because it is an open discussion whether COPs can be created by will or emerge themselves.

(Wenger & Snyder 2000) touches upon this in their discussion about what they call “a paradox of management”, the point being that since COPs are informal and self-organizing, management should nurture and support COPs, just like one supports a garden:

“Like gardens, they respond to attention that respects their nature. You can’t tug on a corn-stalk to make it grow faster or taller, and you shouldn’t yank a marigold out of the ground to see if it has roots. You can, however, till the soil, pull out weeds, add water during dry spells, and ensure that your plants have the proper nutrients. And while you may welcome the wild-flowers that bloom without any cultivation, you may get even more satisfaction from the vegetables and flowers you started from seed.” (Wenger & Snyder 2000, p.143)

Maybe managers should do that - but how? (Wenger & Snyder 2000) presents three bullet points on this, quote:

“identify potential communities of practice that will enhance the company’s strategic capabilities;

provide the infrastructure that will support such communities and enable them to apply their expertise effectively;

use non traditional methods to assess the value of the company’s communities of practice.” (Wenger & Snyder 2000, p.144)

The last bullet point is controversial. And it is also the most important of the three bullet points, because unless unlimited resources are available to managers in a given firm, the evaluation of the value of different COPs will be the basis for a decision of what COPs to nurture. This is, however, if one believes that companies have a “management” which is somehow different from the rest of the COPs making up the constellation of COPs within the organization, which is another weak point in the COP theory I shall return to later, when I argue that management should be seen as one among many practices within an organization.

What is the problem in evaluating the value of COP’s? The problem is, that (Wenger & Snyder 2000) argue, that it should be done by management on the basis of information about the community. This means firstly, that (Wenger & Snyder 2000) sees management in organizations as something which is different from communities of practice, but I will pose the question: does the idea of seeing a company as a constellation of COPs not mean, that we should perceive management as one practice among many practices within a company, and then understand the relationship between say an COP constituted by engineers conducting work on a technical solution passionately and a COP constituted by managers working passionately on refining their management practices as a relationship between two equal COPs rather than a relationship between “management” and a COP? It makes more sense to understand the relationship between “management” and COP, not as a relationship between a “rational management” and “emergent and self-organizing COP” but rather as a relationship between two different COPs involving a power and knowledge relationship. A relationship where relations not only of knowledge, but also relations of power comes together in a construction of meaning, of truth, which in turn gives fabric to the constellation of COPs and furthermore, gives the organization a direction.

This leads me to my second critique of (Wenger & Snyder 2000)’s third point, and this is that they forget the notion of power, and puts so much emphasis on the value of information or knowledge, that they actually end up in position similar to the one found in the old planning school within organization studies (Brews & Hunt 1999). They argue, that managers should use “non traditional methods to assess the value of the company’s communities of practice”, but in practice the method they suggest is as classical as can be, namely to collect as much information

as possible and make a decision on the basis of this – the classical approach in the planning school. They argue, quote:

“Leader intuitively recognize the benefit of developing people’s capabilities. That said, most have difficulties understanding the value of communities...

... The best way for an executive to assess the value of a community of practice is by listening to members’ stories, which can clarify the complex relationships among activities, knowledge, and performance...

... the solution to the conundrum of valuing communities of practice is to gather anecdotal evidence systematically. You can’t just collect certain stories, perhaps the most compelling ones, because isolated events can be unrepresentative. A systematic effort captures the diversity and range of activities that communities are involved in.” (Wenger & Snyder 2000, p. 145)

This all seem rather intuitive and straight forward, but I find this problematic, because in making this argument (Wenger & Snyder 2000) goes against their own theoretical basis, which is to be found in the publications (Lave & Wenger 1991; Wenger 1998). In these publications it is made clear that knowledge is something which is constructed in COPs, in the negotiation of meaning taking place in COPs, and as such the knowledge exist as something which is situated in a context, i.e. the context in the COP. Knowledge is thus a social construction and something dynamic, because if it is moved to another context, say the context within a COP consisting of managers, then it also changes, because then it is renegotiated in a context consisting of a different joint enterprise, mutual engagement and shared repertoire. It is the same point Brown and Duguid touched upon in several of their contributions when they discuss why knowledge can be sticky within an organization (Brown & Duguid 2000a; Brown & Duguid 2000b). Their argument is exactly, that what is obvious within one community, say a community of R&D engineers, often makes no sense within another, for example higher management, due to different practices, as they argue in relation to for example the stories about what happened inside Xerox. They argue:

“The strength of these groups is simultaneously their weakness. Shared practice makes it easy to circulate new ideas within such groups. But the absence of shared practice beyond a group’s boundaries can make it difficult to get these ideas out of the community.” (Brown & Duguid 2000a, no page number)

The problem is therefore, that despite this, (Wenger & Snyder 2000) argues, that knowledge should be collected, managers should form an overview of it, which in nature must be static, and then make a decision of what COPs to support. Two problems emerge with this. Firstly, in the collection, managers have to move towards a more central position in the COP they are seeking information from, to be able to understand what is going on in the COP. Wenger describes in details how outsiders, due to their lacking mutual engagement, joint venture and shared repertoire can find it difficult to understand what a COP is all about and gain access to it, due to lack of shared repertoire etc. And secondly, if they do so, then it also impacts the identity of the managers, as referred to (Wenger 1998) detailed description of the relationship between learning and identity.

What if a COP is moving in a direction due to the passion of its members, which is irrelevant for the company? Does the COP then not need steering? And given the power relations between employers and employee, is it at all reasonable to assume that people are only moulded by their own passion? My point here is not to argue, that managers within an organization cannot form an overview of the communities that exist and what each are working with, where after they support some. That would be plainly illogical. The issue is how to conceptualize the relationship between the so-called management and COPs within an organization. It seems to me, that

(Wenger & Snyder 2000) are too polarizing in their framing, placing the communities of practices on one side, and management on the other, in their discussion of how management should nurture COPs. It seems to me, that given the literature on the nature of COPs, and the detailed accounts of these in (Wenger 1998), it makes more sense to conceptualize management as one among many practices in an organization. As a practice which may be situated in certain communities, but also as a practice which exist and change in a dynamic interaction with other practices in the company, i.e. through boundary processes between COP's centred upon management practices and COPs centred on R&D practices, COPs centred on marketing etc.

What is needed is thus something which adds the notion of power to the relationship between COPs, i.e. how can the relationship between different COPs within an organization, management COPs, R&D COPs etc., be conceptualized in a way so one captures both the knowledge relation as well as the power relations between such, and how they impact each other? I argued earlier, that power is an important, but also not explored part of the COP theory, as presented by (Wenger 1998). In (Wenger 1998) focus is placed on learning, and this is also the case in relation to the discussion about boundary processes, i.e. the processes occurring between different COPs, and thereby the process through which different practices within a company influences each other. A notion of power needs to be added to the way we conceptualize the relationship between different communities and different practices, and I will argue, that this is where Wenger's work and Foucault's work can supplement each other in a useful way.

To make it clear what the value of the Foucauldian approach is, I will for pedagogical reasons bring Foucault in by quoting a researcher who argues that Foucault and Wenger has different focuses. This highlights what a Foucauldian perspective is capable of, and what a Wengerian perspective is not capable of. I will rather argue that the two have different focuses, but builds on some of the same basic ideas. (Jørgensen 2007), who analyzed an organization using Foucault's ideas developed in relation to genealogy, argued:

"... the postmodern writer would never enter the case processing company (Wenger, 1998) or the call centre (Crouch, 2005) with the intention of describing how people learn to be a member of a community, how they create forms of participation and reification (meaning) and how they build up specific modes of belonging (identity) to this community (Wenger, 1998; Lave and Wenger 1991). They would try to question the values embedded and embodied in the talk and actions of the communities and which govern what counts as learning, meaning, identity in these communities, and in this way make people more reflexive of the kinds of power relations they are subjected to but also subjugate themselves to everyday" (Jørgensen 2007, p.40)

(Jørgensen 2007) touches on an important issue here, which is that Wenger's focus is placed on the people in the community and how they interpret their own practices. The Foucauldian researcher on the other hand is less interested in how people perceive what they are doing, but more interested in the power-knowledge relationships, the discourses, which is shaping the practices of the people in question. The problem is that (Jørgensen 2007) leans too much towards a focus on power, and thereby strips the persons of agency. One sometimes encounters a critique of Foucault for focusing on how the individual subject is torn into pieces, labelled as mad or moulded into docile bodies useful in a capitalistic society in his books, without given the individual subject an option or a power to shape the course of events.

However, it is also possible to read Foucault's works in a way, where Foucault actually manages to take into consideration situations where the actions of individual subjects at specific times and places have the ability to transform structures in society or cause new structures to emerge. The problem is, that when people reads Foucault's genealogy and uses it without combining it with the ideas from his archaeology, then the resulting analyses have a tendency to end in a

situation where authors simply investigate who did what to whom and when, and maps this genealogically, claiming to be conducting an power analysis.

In Foucault's early work the focus was the emergence of what we may call grand discourses in society, the notion of madness in (Foucault 2001), the emergence of specific science disciplines in (Foucault 2002) and the emergence of the prison, as discussed above. These studies were rooted at the level of societies. However, when we go to the micro level within organizations, as I shall do in this thesis, then we see, that we also at this level, finds discourses shaping the identity and behaviour of people. These can be thought of as discourses existing on a different level. There are the grand discourses such as the discourses on sexuality or madness cutting through all of society. But there are also smaller discourses, which does not penetrate the whole of society, but only parts of it, for example clusters or a single organizations. Such discourses were what I encountered in my case study in the NorCOM cluster and in TIDK. While there may be grand discourses establishing what it means to be an engineer in Danish society, I also saw smaller discourses establishing what it meant to be a "NorCOM engineer". This discourse apparently cut through the whole cluster and gave engineers in the companies in the cluster an identity. There were also smaller discourses such as the ones constructing what it meant to be a "TIDK engineer". It became clear to me, while doing the case study, that such discourses cutting through an entire organization or an entire cluster, shaping the identity and behaviour of people there and thus also the changes of the organizations and the cluster itself was what was missing from my Wengerian framework. The Wengerian framework did not give me the ability to conceptualize the existence and change of such discourses, because they were framed as external structures influencing learning within the COPs, so due to the framework I became aware of the existence of them, and the impact of them, but had no theoretical basis in Wenger's work as to how they could be investigated in detail in relation to changes etc. And since I saw the impact of them, it also became clear, that it was exactly these discourses and the changes of these discourses which were key in understanding how MNC entry influenced the dynamics within the cluster. Foucault's tools discussed above makes it possible to construct an analytical framework for identifying and investigating such discourses. Wenger in his writings on COP clearly highlights the importance of structures, or discourses, originating outside COPs and influencing the dynamics within COPs, but he treats these as constant and external impacts upon the learning processes which are his focus.

The point I will make in the following can thus be formulated in the following manner: Foucault's ideas about archaeology and genealogy make it possible to develop a framework which is able to illuminate how discourses cutting through COPs within an organization, or even through communities within several organizations, has an influence in shaping the identity and behaviour of the individuals within these. And in this process the persons not only becomes subjects shaped by these external discourses, they also create identities through participating actively in a negotiation of meaning within the COPs of which they are members. The persons are shaped, but they are also active. Two words are in play here, the notion of the subject, which Foucault uses, and the notion of identity which Wenger uses. What is the difference? If we look in the Oxford English Dictionary for a description of the two words, we find the following descriptions for "Subject":

1. "One who is under the dominion of a monarch or reigning prince; one who owes allegiance to a government or ruling power, is subject to its laws, and enjoys its protection."
2. "One who is bound to a superior by an obligation to pay allegiance, service, or tribute; spec. a feudal inferior or tenant; a vassal, retainer; a dependant, subordinate; an inferior"
3. "A person (rarely, a thing) that is in the control or under the dominion of another; one who owes obedience to another."

4. "A thing over which a right is exercised."
 5. "The substance of which a thing consists or from which it is made"
 6. "The substance in which accidents or attributes inhere"
 7. "That which has attributes; the thing about which a judgment is made"
 8. "The member or part of a sentence denoting that concerning which something is predicated (i.e. of which a statement is made, a question asked, or a desire expressed); a word or group of words setting forth that which is spoken about and constituting the 'nominative' to a finite verb."
 9. "More fully conscious or thinking subject : The mind, as the 'subject' in which ideas inhere; that to which all mental representations or operations are attributed; the thinking or cognizing agent; the self or ego."
 10. "The subject matter of an art or science."
 11. "A thing affording matter for action of a specified kind; a ground, motive, or cause."
 12. "That which is or may be acted or operated upon; a person or thing towards which action or influence is directed, or that is the recipient of some treatment"
 13. "In a specialized sense: That which forms or is chosen as the matter of thought, consideration, or inquiry; a topic, theme."
 14. "The theme of a literary composition; what a book, poem, etc. is about."
 15. "An object, a figure or group of figures, a scene, an incident, etc., chosen by an artist for representation."
 16. "The theme or principal phrase of a composition or movement; in a fugue, the exposition, dux, or proposition; first (second) subject, the primary (or subsidiary) theme of a composition, esp. in sonata-form"
 17. "That upon which something stands; a base"
- (www.oed.com 2011d)

We see from these definitions that two main spheres of use occur; one is the non-personal use, for example when the subject of an analysis is a concept such as the prison or the notion of madness. When it comes to the other, which is to perceive a person as a subject, then we see clearly that this use implies that the person in focus, the subject, is under the influence of something or somebody. It is a person subjugated to laws, a ruling power, which is under dominance, who is inferior, over whom rights are exercised just to pick some of the words used in the quote above. When Foucault talked about subjects, he did not mean the subject as a complete person, with one specific identity, covering all aspect of life. When he described how a person was constructed as a subject, it was in relation to specific practices, for example as a subject in relation to sexuality, as he clarified in the interview "The ethics of the Concern for the Self as an Practice of Freedom" (Foucault 2000), where he argued:

"What I wanted to try to show was how the subject constituted itself, in one specific form or another, as a mad or a health subject, as a delinquent or nondelinquent subject, though certain practices that were also games of truth, practices of power, and so on." (Foucault 2000, p.290)

This is an important point, because, later in the text he elaborates on what he means by games of truth:

"The word "game" can lead you astray: when I say "game," I mean a set of rules by which truth is produced. It is not a game in the sense of an amusement; it is a set of procedures that lead to a certain result, which, on the basis of its principles and rules of procedure, may be considered valid or invalid, winning or losing" (Foucault 2000, p.297)

These procedures, was what he tried to capture in his works, in the archaeology through the focus on discourses, which guided what statements occurred and which that did not, and thus what was valid to say and not valid to say. In the genealogy through the focus on the emergence and descent of events, and the power-knowledge relations through the configuration of which events emerged. The focus was on how parts of people's behavior in relation to specific practices were constructed, or in other words, how they were constructed as subjects. We see the subjugation clearly in the writings on disciplinary practices. In the history of sexuality the subject becomes more active, now the person is not just the subject over which power is exercised; now the person is an active person who must talk, who must confess. But still it runs through Foucault's analysis that it is structures in society, discourses, power-knowledge relations, which has made this reality around the confession in which the subject becomes a talking subject. In his influential lectures on bio-politics, the action of persons comes into focus even clearer, because now the issue is not only the practices guiding the behaviour of people, but also how people guide their own behaviour. Turning to the concept of identity, the Oxford English Dictionary presents the following descriptions:

1. "The quality or condition of being the same in substance, composition, nature, properties, or in particular qualities under consideration; absolute or essential sameness; oneness."
 2. "The sameness of a person or thing at all times or in all circumstances; the condition of being a single individual; the fact that a person or thing is itself and not something else; individuality, personality"
 3. "Personal or individual existence"
 4. "The equality of two expressions for all values of the variables"
 5. "A person long resident or well known in a place; a local eccentric; such persons collectively"
 6. "The condition of being identified in feeling, interest, etc.; identification with."
 7. "An element of a set which, if combined with any element by a (specified) binary operation, leaves the latter element unchanged"
- (www.oed.com 2011e)

Here we see that the focus is placed upon the substance, the nature, the fact of being an individual. Learning and identity is connected in (Wenger 2004)'s perspective, and power is perceived as something which impact the process through which learning and identity construction occurs. According to (Wenger 2004) we cannot distinguish between the individual and the group when discussing identity, because identity is constructed in the relation between the individual and the group. On the one hand identity is constructed in the negotiation of meaning which occurs when people take part in communities. It is the experience they get from the participation process. On the other hand, this does not mean, according to (Wenger 2004), that identity is something collective, because each person participate in a community with a unique identity, and receives an unique experience from the participation. So identity happens, so to say, in the intersection between the group and the individual, but it is not a clearly personal entity, since it is dependent upon the group, and neither is it a collective entity since it is dependent upon the individuals making the experience. People are not only part of one specific community; they are part of multiple communities, so identity is something which is constructed in the interplay between a given person and a configuration of several different communities. This is why (Wenger 2004) conceptualizes identity as a "nexus of multiple membership", and argues, quote: "We define who we are by the ways we reconcile our various forms of membership into one identity"(Wenger 1998, p.149). It is a similar argument (Brown & Duguid 2000b) makes:

"In learning to be, in becoming a member of a community of practice, and individual is developing a social identity. In turn, the identity under development shapes what that person comes to know, how he or she assimilates knowledge and information" (Brown & Duguid 2000b, p.138)

If we are to understand the factors influencing how the identity of a given person is constructed this means we need to focus on the factors influencing this nexus of multiple membership. To conceptualize the issue of power, and how it seeps through the issue of multiple memberships, we need to note, that COPs are not necessarily harmonic places where everybody agrees with each other:

"... participation as I will use the term is not tantamount to collaboration. It can involve all kinds of relations, conflictual as well as harmonious, intimate as well as political, competitive as well as cooperative." (Wenger 1998, p.56)

This call for a focus on two conceptual dimensions, the first one being power in relation to the individual COPs within the nexus of multiple membership, the second being power in relation to the nexus itself. In other words, what is influencing the dynamics within the given COPs constituting the nexus, and what is influencing how the nexus as a whole developed, the given configuration of COPs of which a person is a member that is? Wenger is explicit on the first issue, stating that in relation to COPs, power should be understood as something productive, which can be both positive and negative, quote:

"Again, saying that communities of practice produce their practices is not saying that they cannot be influenced, manipulated, duped, intimidated, exploited, debilitated, misled, or coerced into submission; nor is it saying that they cannot be inspired, helped, supported, enlightened, unshackled, or empowered. But it is saying that the power – benevolent or malevolent – that institutions, prescriptions, or individuals have over the practice of a community is always mediated by the community's production of its practice. External forces have no direct power over this production because, in the last analysis (i.e., in the doing through mutual engagement in practice), it is the community that negotiates its enterprise." (Wenger 1998, p.80)

Given this power must be conceptualized as a three-dimensional entity in relation to the dynamics within COPs: The first dimension is the relationship between the members of the COP and the surrounding world. Members within the COP might influence the surrounding world through their actions or be influenced in their actions by the surrounding world. The second dimension is the negotiation of meaning occurring within the COP in parallel with the stimulus caused by the first dimension, i.e. the relationship to the surrounding world. Within these, issues of power and knowledge between the members play a role, this is shown in for example the discussion of newcomers who have a more peripheral position in the community compared to more central members. The third dimension is the changes in identity which the negotiation of meaning gives rise to at the level of the people constituting the COP.

Let us look at a thought example to clarify this: a COP consisting of steelworkers is forced by management into accepting new employment terms making their workday different; this is the first dimension: impact from something outside the COP upon the practices within the COP. As this change in the work occurs, as new work schemes are presented for the workers etc., negotiation of meaning takes place within the COP in which this changing situation is negotiated by the members, and this is the second dimension. While this occur the changes, and the negotiation of these changes gives rise to simultaneously individual experiences by the people constituting the COP, which in turn shapes their identity, this is the third dimension.

The reason why I break this process down into three dimensions in which dynamics occur simultaneously is to be able to conceptualize the notion of power in relation to these three dimensions.

1st Dimension: Relation between Surrounding world and the COP

2nd Dimension: Relations between members of the COP

3rd Dimension: Relation between the COP and individual members

I will say that the way in which Wenger describes the first dimension, power is conceptualized in a Foucauldian way, because power is seen as something enacted by specific persons or communities. It should be noted, that (Wenger 2004) have four of Foucault's works in his reference list, and I have personally discussed Foucault's theories with Wenger, and knows from this that he is well aware of the Foucauldian way of conceptualizing power.

Wenger is clearly using a conception of power as something enacted to frame the relation between the COP and its surrounding world in the quote above; he does not say that anybody have power 'over' the COP, instead he uses words as tricked, exploited, helped which puts emphasis on process. He states this view explicitly later when he dwells on the relation between identification and negotiability:

"Talking about identities in terms of an interplay of identification and negotiability will bring issues of power to the fore. As I specified in Chapter 8, power is not constructed exclusively in terms of conflict or domination, but primarily as the ability to act in line with the enterprises we pursue and only secondarily in terms of competing interests. I will treat issues of power not so much in terms of political institutions or economic systems, which are the traditional focus of theories of power, but in terms of the negotiation of meaning and the formation of identities – that is, as a property of social communities. My focus on community, meaning, and identity is not to deny the importance of broader political and economic issues. The marginality of claim processors is certainly a function of a specific political and economic system, in which Alinsu represents a concentration of power. But what struck me was the extent to which such a system affects the lives of people throughout the communities and identities they construct. Here, I will focus on just one aspect of power as an element of social life by arguing that a social concept of identity entails a social concept of power, and, conversely, that a discussion of power must include considerations of community, negotiation of meaning, and identity. Note that issues of power of the kind I am discussing are inherent in social life, and will not disappear even if we are so lucky and wise to devise an ideal economic and political system." (Wenger 1998, p.189-191)

Given this one might ask how power is enacted in relation to COPs. Wenger states as discussed earlier, that external forces can influence COPs in a processual way, but such influences from the outside, be that managers, laws, etc, has no direct influence upon the negotiation of meaning within the COP, because this negotiation is conducted and, so to say, owned by the members constituting the COP. This quite clear distinction between influence from the outside, on the one hand, and negotiation within on the other, is however too simple. Something is indeed influencing the members in their negotiation, which Wenger himself admits when he argues, that one should not deny that the claims processors he was studying was influenced by larger structures which they themselves was not able to influence much, quote:

"Their position within a boarder system. Their job is part of a large industry and the result of a long historical development. They did not invent claims processing, nor do they have much influence on its institutional constitution" (Wenger 1998, p. 79 Original Italics)

The claims processors were claims processors, and saw themselves as such, but importantly, they did not invent claims processing, which is as he frames it part of a long historical development. The fact that Wenger can study claims processors is due to the fact that the notion of claims processors has been constructed in society, the whole concept can be seen as a construction, which in turn impacts the negotiation of meaning. As Wenger describes, Ariel, in the quote below, uses her status as a claims processor when she negotiates meaning.

"For Ariel, belonging to the profession of claims processing or to an organization like Alinsu constitute relations whose meaning she negotiates through her participation in her community of practice. For instance, when one of her colleagues was fired for speaking against the company at a radio show, claims processors used each other as resources for making sense of this event. Their local community of practice became a productive context in which to discuss whether it was right for the claims processor to criticize her employer publicly or for the company to respond by firing her." (Wenger 1998, p.162)

My point is, that what (Wenger 2004) sees as global here, or "outside" the influence of the members of the COP, is discussed and interpreted within the COP. However, as also stated the members of the COP Wenger is studying does not have much impact on the claims processor profession, so basically, although the negotiation of meaning is owned and conducted by the members in the COP, one structure which is influencing the negotiation of meaning is the idea of what the claims processor profession is, which is an idea which has been constructed largely outside the COP within the wider society.

This raises one issue if we look at the works of Foucault: Is all of such external impacts really negotiated? It seems plausible looking at the things Foucault wrote about how discursive formations define what is possible to say and what is not possible to say, see section 3.3, that some of the structures, or discourses, emerging outside a COP, can penetrate one or several COPs and shape the identity and the actions of the people within these COPs without the members being actively aware of these discourses. Or in other words, it seems plausible that discourses emerging outside COPs define what is possible, to say, do and think within the COP without the members being aware of this impact of specific discourses. This issue of something which influence the practice within an COP in an un-negotiated way is also what (Brown & Duguid 2000b) touches upon in their discussion of how practice is something which is situated in a social context. It seems that there is a difference between the way in which (Brown & Duguid 2000b) and (Wenger 2004) conceptualize the point that practice is something which is "situated". (Brown & Duguid 2000b) seem to value the social context in which the practice was developed, the society with specific norms, or in a company the practices developed in specific departments dealing with specific work areas, more than (Wenger 2004) who seems to value the social interaction and the negotiation of meaning within the community more. (Brown & Duguid 2000b, p.139-140) thus discuss the example of Robinson Crusoe, who stranded on his Island, nevertheless behaved like a "true-born Briton". Quoting from Defoe's book and commenting on this, they explain:

"Our friend Robinson... having rescued a watch, ledger, and pen and ink from the wreck, commences, like a true-born Briton, to keep a set of books. His stock book contains a list of the objects of utility that belong to him, of the operations necessary for the production; and lastly, of the labour time that definite quantities of those objects have, on average, cost him.

Robinson is not just a man in isolation, but a highly representative member of what Napoleon was to call a "nation of shopkeepers"...

... So while people do indeed learn alone, even when they are not stranded on desert islands or in small cafés, they are nonetheless always enmeshed in society, which saturates our environment, however much we might wish to escape it at times. Language, for example, is a social artefact, and as people learn their way into it, they are simultaneously inserting themselves into a variety of complex, interwoven social systems." (Brown & Duguid 2000b, p.139-140)

The point is that (Wenger 2004) focus on how such external structures as being a true-born Briton, in his case being a claims processor, is negotiated within the community. (Brown & Duguid 2000b) is more interested in the fact that there are such structures and that they influ-

ence the behaviour of people, whether they are negotiated or not. The important thing is the structures lying outside the community influencing behaviour within it in an un-negotiated way. And whereas (Wenger 2004) stresses the personal interaction as the key dynamic, the negotiation of meaning as discussed earlier, (Brown & Duguid 2000b) seem to put more emphasis on the practice people do, so that their focus is on what, say, copy machine repair men do to get their work done, more than how they negotiate it:

“People with similar practices and similar resources develop similar identities – the identity of a technician, a chemist, a lepidopterist, a train spotter, an enologist, and archivist, a parking-lot attendant, a business historian, a model bus enthusiast, a real estate developer, or a cancer sufferer. These practices in common (for hobbies and illnesses are practices too) allow people to form social networks along which knowledge about that practice can both travel rapidly and be assimilated readily” (Brown & Duguid 2000b, p.141)

So (Brown & Duguid 2000b) also points to the fact that there are indeed some structures emerging outside COPs that influence behaviour within them, and do so in a way in which the impact is not necessarily negotiated. And this was exactly what I found in my case study. It appeared that the engineers I saw in the TIDK case were indeed shaped by a discourse defining what a “NorCOM engineer” was, but this discourse influenced the engineers in an unspoken manner. It was apparently not a negotiated influence, where the engineers had a clear understanding of what a NorCOM engineer was, and discussed how they ought to behave as NorCOM engineers. The discourse apparently influenced them in a more fundamental way; it apparently shaped what was possible to say and do, and how they behaved without their own awareness. It defined what was the right attitude towards political games within the organization, how one could and could not treat colleagues. It defined what one should value in the work, quality over cost considerations for example, and much more. The important point is that it was not an external discourse which was negotiated within the COPs and gave rise to this specific behaviour. It was a discourse emerging within the cluster which in turn shaped what was possible to say and think, and what was not possible to say and think.

What I want to say here is, that if we are to understand what influences the negotiation of meaning within a COP, then we must focus on both the negotiation of meaning occurring within the COP, i.e. the actions of the members of the COP, which in turn influence their identity, and also, and this is the important point, which I believe is understated in the COP literature, focus on the discourses and practices which has been constructed outside the COP in the wider society, but which nevertheless is influencing the negotiation of meaning within the COP. How can we conceptualize and analyse such discourses or concepts, which can penetrate several communities within an organization, or even the communities within several organizations in a cluster, and define identity and behaviour? To do so is where we need the works of Foucault.

What Foucault taught us was to question the “state of affairs” in society and not take things for granted, he showed how madness was constructed, how the clinic was constructed etc., and one could most likely make a similar study of how the claims processor profession has been constructed in society. In posing this question one highlights the other side of the coin, in relation to (Wenger 2004)’s quote above, which is not the following; how is the claims processor profession interpreted locally, but rather; how is the claims processor profession constructed? The point is, that instead of focusing solely on the dynamics through which the membership of a given procession is constructed and experienced locally as (Wenger 2004) does, one should also focus on how the profession in question is constructed.

And this brings me back to issue of why I dismissed the Wengerian approach and chose the Foucauldian approach instead. This was because I could see in the empiric data, that the impact of

the MNC acquisition in the case of TIDK had been the emergence of conflicts and tensions between engineers and managers who were what one may call “TIDK engineers and managers” and also “NorCOM engineers and managers” and between engineers and managers other places in TI. Managers and engineers in TIDK were different from managers and engineers in other places within TI. And the main question therefore was: Why was this case? This was the difference I realized during the meeting I began this thesis with a description of. To answer this I had to study how the people I saw in TIDK had been constructed as precisely the people they were, through different discourses and practices. The people in TIDK were influenced by discourses which gave them an understanding of what they were and how they ought to behave, and the case study showed that this clearly made them different from engineers and managers in other TI sites. And it therefore dawned on me, that to understand how MNC entry had influenced dynamics within NorCOM cluster I had to investigate how the engineers and managers had been constructed in the interplay between the cluster and the MNC in the case of TIDK. How had these people been constructed in the interstice between the cluster of which they were part, and the MNC they were also part of. And further, how the cluster itself had been constructed as a concept and an organization. And to analyse this, Wenger’s approach was not as good a tool as Foucault’s ideas on genealogy and archaeology. As discussed above Wenger touched upon identity, but does so in a way in which it is something which is impacted by the experience of being member of a COP. On the contrary, Foucault presents elaborate tools for analysing how people are made into subjects in society, and this was why I chose the Foucauldian approach instead of Wenger’s. Let us not turn focus to the phronetic approach to science.

Chapter 4: The phronetic approach to science

The previous chapter presented an introduction to Foucault's work and a detailed reading of some of his key works on genealogy and archaeology, as well as a discussion of what Foucault captures with his approaches that Wenger does not capture, and why Foucault was chosen over Wenger, as the basis for the analytical framework in this thesis. As argued in the introduction to this part of the thesis, I will combine Foucault's genealogy and archaeology with Flyvbjerg's approach to social science, which he terms phronetic research, because Flyvbjerg does not settle with writing the history of the present, as Foucault did, but adds the two questions, is it desirable, and if not, what should be done about it?.

(Flyvbjerg 2001) further offers the phronetic approach to social science as way out of the deadlock of the so-called science wars: the dispute between social science and natural science which emerged in the 1990's (Flyvbjerg 2001). The reason why it offers a way out of the deadlock, is that it has another focus which can give social science a new direction, and thus make social science "matter again", to use (Flyvbjerg 2001)'s term. Flyvbjerg's argument is shortly put, that social science has been locked in a deadlock with the natural sciences in the science wars, because social science has tried to imitate natural science since the enlightenment. And this is not strange, since the natural sciences has had a tremendous success:

"There is a logical simplicity to the natural science paradigm, and the natural sciences' impressive material results speak for themselves: these sciences certainly have an undeniable basis as a means by which we have attempted to achieve mastery over nature, technology, and over our own conditions of life. In this interpretation advances in natural-science research and technological progress are founded upon a relatively cumulative production of knowledge, the key concepts being explanation and prediction based on context-independent theories" (Flyvbjerg 2001, p.26)

The problem with this is that by trying to imitate natural science, social science has made very little progress. And this is because the concept of universal theories, which can explain and predict, which has been the core of the well functioning hypothetical-deductive approach in natural science, does not work in social science according to (Flyvbjerg 2001). Theories cannot be used in the same way in social science as they are in the natural sciences. If the use of theories, as they are understood in natural science, is a dead end for social science, then the question becomes: what should then be placed at the centre of social science. The question, to this, is according to (Flyvbjerg 2001) the issue of values, which lies at the centre of the phronetic approach to social science.

I will not repeat (Flyvbjerg 2001)'s argument in detail here, but just draw out a number of points, which I find crucial in relation to this thesis, and then present and discuss (Flyvbjerg 2001)'s guidelines to phronetic research. Firstly, I will dwell on the notion of theories, and why their use falls short in social science, according to Flyvbjerg. This is an important discussion, because large parts of the cluster literature rest on such theories, inspired by economics, and this natural science ideal, and therefore I will dismiss these in this thesis. This will be the focus for section 4.1.

Secondly, I will turn to the core of phronetic social science, which is a focus on values, and discuss the guidelines for phronetic social research, so that I can argue for what kind of research this thesis constitute in section 4.2, when I turn away from the normal use of universal and predictive theories found in the cluster literature, and towards a Foucauldian and Flyvbergian approach instead.

Finally, in section 4.3, I will elaborate upon the use of case studies and their value in relation to generalization, so that I form a basis for discussing the use of case studies in this thesis, and how to generalize the results of this thesis. Let us now turn to why the economically inspired cluster theories are a dead end.

4.1 Why theories falls short in social science

(Flyvbjerg 2001) argues, drawing on amongst others Socrates, Descartes, Kant and Dreyfus, that an “ideal” theory fulfils six criteria’s:

- It is explicit: “... a theory is to be laid out so clearly, in such detail, and so completely that it can be understood by any reasoning being...” (Flyvbjerg 2001, p.38)
- It is universal: “... it must apply in all places at all times” (Flyvbjerg 2001, p.38)
- It is abstract: “... it must not require the reference to concrete examples” (Flyvbjerg 2001, p.38)
- It is discrete: “... formulated only with the aid of context-independent elements, which do not refer to human interests, traditions, institutions, etc.” (Flyvbjerg 2001, p.38-39)
- It is systematic: “... it must constitute a whole, in which context-independent elements (properties, factors) are related to each other by rules or laws” (Flyvbjerg 2001, p.39)
- It is complete and predictive: “The way a theory accounts for the domain it covers must be comprehensive in the sense that it specifies the range of variation in the elements, which affect the domain, and the theory must specify their effects. This makes possible precise predictions” (Flyvbjerg 2001, p.39)

(Flyvbjerg 2001)’s argument is, that neither in natural science or in social science does scientists ever fulfill these demands completely. And in the discussion (Flyvbjerg 2001) only deals with theories which are predictive, because these are the ones which makes it clear, why it seems likely that social science cannot rest on the use of such theories. The reason why theories, in the ideal predictive sense, do not work in social science is because of the exclusion of context. When the object with which a theory deal is not a dead physical objects, as it is in the natural sciences, but instead thinking humans, then the situation emerges that the humans, the actions of whom a theory describe, can become aware of this theory, and change their behavior as a result, and therefore the theory loses its ability to describe the behavior of the humans, and also predict their behavior. (Flyvbjerg 2001) thus draws on Bourdieu’s critique of Lévi-Strauss’s gift exchange theory to illustrate this point, and the most devastating critique is, according to (Flyvbjerg 2001), the fact that:

“He [Bourdieu] argues that Lévi-Strauss’s abstractions are fundamentally incorrect because no kind of gift exchange would take place if exchange were perceived as the simple, reversible operations described by Lévi-Strauss’s theory.” (Flyvbjerg 2001, p.41)

The context is what guides human behavior, an argument which (Flyvbjerg 2001) builds on (Dreyfus & Dreyfus 1986)’s model for learning, where they argue that knowledge cannot be reduced to rules, and since theories by definition has to exclude the context, theories can possibly never explain human behavior:

“It is the contradiction between scientific theories’ necessary freedom from context and the actual context-dependence of people’s expert decisions on what counts as relevant actions that causes predictions on the basis on “theories” about human activity to err at a specific moment; namely, at precisely the moment when an action which according to the theory be-

longs to a distinct category of actions, is no longer considered to belong to this category by the people within the group to which the theory applies" (Flyvbjerg 2001, p.43)

Economics is the social science which, building on theories, has come closest to the natural science ideal. (Flyvbjerg 2001) coins economics a second order science, because since the first-order context independent theories cannot be established, economics abandon this goal. Socially constructed concepts such as money, value, property etc. are instead taken as given by economists, and are used as the building blocks on which theories are build. This means however, that the economic theories only holds as long as these socially constructed concepts remain constant. When something changes these, then the theories also lose their value (Flyvbjerg 2001).

This is why, on the downside, in the case of two planes hitting World Trade Center, and thus altering a number of social constructions in society, some economic dynamics occurs, which no economic theory had predicted. On the bright side, and this is no doubt part of the reason for the success of economic theories and their use throughout society, this of course also means, that as long as the context of the economic theories remains relatively stable, the theories can be useful.

Although they might be useful, second order sciences, they have one serious problem from a scientific point of view, and this is that they are not capable of providing an explanation. There are according to (Flyvbjerg 2001) different view on what counts as an explanation within theory of science, but on one point there is agreement, and this is that:

"... if all those factors which compromise a theory remain unchanged while the resulting activity, i.e., the activity to be explained by the factors, varies, then the theory has not provided a comprehensive explanation of the relevant behavior" (Flyvbjerg 2001, p.45)

It therefore follows, given the nature of second order science such as economics has a fundamental flaw, and it is questionable whether the ideal of prediction can ever be reached in the social sciences (Flyvbjerg 2001).

It is necessary here to draw a link back to the discussion of the cluster literature in the second chapter. The new economic geography is clearly a second order science, and I will argue, that of the two other approaches especially the "economic approach", and also to an extent the "the historical approach", can be regarded as second order sciences. It was discussed in chapter 2, that what characterizes the "economic approach" is a quest to construct theories explaining clusters. Given the previous discussion of why economics as a second order science has a fundamental problem, it is hardly a surprise, when one takes a step back and regards the literature on clusters in the "economic approach" at a distance, that this has an even more serious weakness than economics in general.

The issue is that this line of literature is trying to construct theories about what clusters are, how they work, and how they change. However, placing this line of literature in an even worse situation is firstly the fact, that the concepts used in the cluster literature, i.e. the social constructions used as given for construction of the theories, for example the concepts of "tacit knowledge", of "proximity" etc., are less well-defined than the concepts in classic economy, such as the concept of "money". This means that not only does the cluster theories have the same problem as economic theories in general, which is that society can change underneath them, making them unable to explain the behavior they are meant to explain, as discussed above, but also, given the fuzziness of the buildings blocks, the theories becomes even more fragile. And secondly, and this is the main problem, whereas the empirical tests are widespread in classic economy, the empiric tests of hypothesis are often missing completely in the cluster literature as discussed earlier, where it was argued that the contribution in the economic approach are lacking empirical foundation, and as also discussed, this probably has to do with the fuzziness of the concepts used in

the theories, which makes empirical validation of the theories difficult. It is thus striking, to illustrate this point with an example, that one of the key contributions in the “economic” approach, (Maskell 2001), who aims explicitly at creating a knowledge based theory of clusters, can do so, without any empirical tests of the propositions made. It thus seems that the literature in this case, has left even the last link to empiric data, and has just become exercises in the construction of arguments using socially constructed concepts as building blocks, without regard for the empiric reality.

Looking at the theory on learning which I did draw on in the initial phase of the case study, before it was dismissed, the situation is a bit different. Whereas the literature on clusters has been inspired significantly by economics, and the natural science ideal, the theory on learning in communities of practice comes out of another tradition; the anthropological, as mentioned earlier. In this tradition focus is placed relatively more on empirical studies and on situated practice. And although Wenger aims to develop what he calls a social theory on learning (Wenger 2004), and draws on a number of theories from many different fields, his work is also based on empirical investigations of situated practice. Their goals were different, as discussed earlier, but in their research they both placed emphasis on uncovering practices situated in specific contexts, and they celebrated the meaning of this context, and investigated the issue of identity. They illuminate the construction of identity from two different sides in a way, which makes it useful to think about the relationship between the two. Therefore I devoted a section in chapter 3 to discuss how the two are complementary. I believe that this was an important point to make, since it can hopefully help convince the reader coming from the cluster literature, in which Wenger is no stranger, what a Foucauldian approach gives to the analysis that a Wengerian learning perspective does not, and that the two approaches do not come from different worlds, and that Foucault’s analytical approach can be a valuable tool in understanding the dynamics that shape clusters.

If social science cannot hope to emulate the natural sciences, using theories and hypothetical-deductive research designs, what way should the social sciences thus choose instead? To this (Flyvbjerg 2001) offers the phronetic approach to social science, which places values at the centre of the research. I will argue that this is also a road which offers a way out of the situation which the cluster literature finds itself in today, where it is bogged down in a terminological soup, as argued earlier.

4.2 The phronetic approach to social science

The core in phronetic science is as argued in the beginning of this part of the thesis the issue of values, and thus the questions about where we are moving, whether it is desirable and if not, what should be done? These questions deal not primarily with what should be done, i.e. the means, but primarily with the ends: are we on a desirable course? First when this question is answered, focus is placed on the means. And answering this second question demands a focus on values, and this entails an Aristotelian phronetic approach to science, which is fundamentally different from the Platonic approach, which celebrates the universal laws, and which has been the basis for the natural sciences:

“The person processing practical wisdom (*phronimos*) has knowledge of how to behave in each particular circumstance that can never be equated with or reduced to knowledge of general truths. *Phronesis* is a sense of the ethically practical rather than a kind of science. Where rational humans for Plato are moved by the cosmic order, for Aristotle they are moved by a sense of the proper order among the ends we pursue.” (Flyvbjerg 2001,p.57)

This distinction is clear when one opposes the episteme to the phronesis. (Flyvbjerg 2001) described the characteristics of the episteme as:

“Scientific knowledge. Universal, invariable, context independent. Based on general analytical rationality. The original concept is known today from the term “epistemology” and “epistemic”.” (Flyvbjerg 2001,p.57)

Phronesis is described by (Flyvbjerg 2001,p.57) as:

“Ethics. Deliberation about values with reference to praxis. Pragmatic, variable, context-dependent. Oriented toward action. Based on practical value-rationality. The original concept has no analogous contemporary term.” (Flyvbjerg 2001,p.57)

The context is placed at the centre of the analysis and it is used as the basis for describing which way to go. This means, that the primary research design becomes the case study, in which the phronetic researcher can go into detail with the context, and make a judgment, on the basis of the analysis of the context, about whether the present course is desirable, or if not, what to do about it. Consequently, it also entails a different understanding of validity and objectivity, compared to the one found in the epistemic natural sciences. Validity is a matter of making the “better” interpretation of the case, as I shall elaborate on below. Objectivity becomes a matter of investigating and describing the “polyphony of voices”, amongst the persons in the case in the analysis. And the goal thus becomes, on the basis of the interpretation of the case, in which the polyphony of voices is examined, to conclude whether things should be changed, and if so how, on the basis of the values identified in the case (Flyvbjerg 2001). This is the core of the phronetic approach to social science. Let us therefore turn to (Flyvbjerg 2001)’s guidelines for how to conduct phronetic social science. To his guidelines for phronetic social science, Flyvbjerg argues:

“I would like to stress immediately that the methodological guidelines summarized below should not be seen as methodological imperatives; at most they are cautionary indicators of direction. Let me also mention that undoubtedly, there are ways of practicing phronetic social science other than those outlined here. The most important issue is not the individual methodology involved, even if methodological questions may have some significance. It is more important to get the result right, that is, arriving at a social science which effectively deals with public deliberation and praxis, rather than being stranded with a social science that vainly attempts to emulate natural sciences.” (Flyvbjerg 2001, p.129)

The last point about getting the results right is important; it is not a matter of following one or another methodology, or obeying all the guidelines for phronetic science, the goal is to conduct science in a way which places values at the centre of the analysis. The case study methodology can, for example, be the basis for phronetic social science, but this does not mean, that the use of case studies as a method always per se makes the work phronetic.

When I started the case study in this, focusing on learning, as mentioned in chapter 1, the decision was based on the value of case studies when it comes to depth of the analysis, as argued by (Flyvbjerg 2006). This was at a time, where I was still utilizing an abductive research design, building on theories on learning in communities of practice, and using a the case study methodology which has been used extensively in the literature on communities of practice, due to its depth, see for example (Wenger 1998) and (Orr 1996). It should be noted, that the approach (Wenger 2004) uses is also abductive. He does not use a deductive approach, because although he draws on different theories, he does not develop a set of theoretical hypotheses or models theoretically to describe how learning functions which he tests using empirical data. Rather, he goes back and forth between his empirical case and different theories and from this he develops his own theory. And it was exactly this depth, and the abductive approach of going back and forth between the different theories on clusters and the Wengerian learning theory as well as

the empiric data, which made me realize, that I needed an analytical approach which placed more emphasis on power. And that was the reason I chose the Foucauldian approach instead of the Wengerian, because, this made it possible to analyze how the people, the organization and the cluster itself, I was studying, was constructed as subjects and entities. This choice of the Foucauldian approach also meant, that I was no longer doing abductive research. And in Flyvbjerg's concept of phronetic research I found a way of framing what I was doing, which in turn also helped me clarify the approach even further.

I therefore decided to do a phronetic piece of research. To understand what it means, that this thesis is structured as a piece of phronetic research, and how this fits with the Foucauldian genealogy and archaeology, it is necessary to go through the guidelines for phronetic research. I will structure the presentation of these guidelines so that I firstly present them and discuss them in relation to Foucault, in order to present the guidelines and argue why they are compatible with Foucault. Thereafter, in section 4.2, I will discuss the implication of the guidelines for this thesis, i.e. what are the consequences of using them in relation to the structure of this thesis and the choices I have made.

The first guideline is according to (Flyvbjerg 2001) a focus on values:

"By definition, phronetic researchers focus on values; for example, by taking their point of departure in the classic value-rational questions. Where are we going? Is it desirable? What should be done?..."

... Distancing themselves from foundationalism does not leave phronetic researchers normless, however. They take their point of departure in their attitude to the situation in the society being studied. They seek to ensure that such an attitude is not based on idiosyncratic morality or personal preference, but instead on a common view among a specific reference group to which the researcher refers. For phronetic researchers, the socially and historically conditioned context – and not the rational and universal grounding which is desired by certain philosophers, but which is not yet achieved – constitutes the most effective bulwark against relativism and nihilism. Phronetic researchers realize that our sociality and history is the only foundations we have, the only solid ground under our feet" (Flyvbjerg 2001, p.130)

The link to Foucault's idea that subjects within society, as well as society itself, is nothing more than the outcome of a fragile history, building on struggles, accidents and misunderstandings is visible here. This conception of society means, that the phronetic researcher can do nothing else than analyze the specific history forming the basis for our situation, and this is why Flyvbjerg mentions the "socially and historically conditioned context", in the quote above, as the bulwark against relativism and nihilism. Values cannot be universal in such a society, and this means that the only way in which values can enter the analysis, is through a process where the researcher investigates the values present in the case. The researcher in this process cannot place himself outside the case he studies, he also becomes part of it, he constructs his understanding in cooperation with the people he study, and his result will also influence the people he study. This was the point made above as to why theories, as used in the natural sciences, do not work in social science: the people whom they describe will become aware of them, and maybe change their behavior accordingly. This means, that instead of trying to maintain a distance to the case, the researcher is forced to accept that he is part of the phenomenon he is studying, a point Foucault made clear in (Foucault 1998). The researcher must therefore investigate the values present in the case, and on the basis of this choose a side, and make this explicit. And this should be the basis for the conclusion as to whether the direction is desirable or not. In making such an analysis, the validity of the analysis comes from the explanation of the line of events in the case, or in other words, from the interpretation which is made. To fuse Flyvbjerg's argument of the "better

interpretation” with Foucault’s words, it is about giving the “better” interpretation of the descent and emergence of the event we are studying.

“... the key point is the establishment of *better* alternatives, where “better” is defined according to sets of validity claims. If a better interpretation demonstrates the previous interpretation to be “merely” interpretation, this new interpretation remains valid until another, still better interpretation is produced, which can reduce the previous interpretation to “merely” interpretation.” (Flyvbjerg 2001, p.131 Original Italics)

The analysis of values is thus not simply a matter of choosing a side for the researcher. Instead it becomes a matter of analyzing in detail the course of events leading to the situation which is studied in the case, and thereby to illuminate the different values involved in the case. And in doing so, objectivity comes from being able to “dialoguing with a polyphony of voices”, which is the ninth guideline I shall discuss below, the point is, that the researcher has to make sure that the different sides of the situation are illuminated. What distinguishes the researcher, from a person simply involved in the situation, is that the researcher is expected to describe the different values involved, and on the basis of this describe the “problematiques” these different values give birth to, and further, given the different values and views identified in the analysis, what the solution to these “problematiques” ought to be. Again, it should be emphasized, that the problematization the researcher describes is not something he constructs, it is the tensions, issues, struggles that are present in the given specific context in place and time under investigation, and which in turn makes it possible for the researcher to describe them as a problematic, remember, that Foucault described problematization as:

“... the ensemble of discursive and non-discursive practices, that make something enter into the play of true and false and constitute it as an object of thought (whether in the form of moral reflection, scientific knowledge, political analysis, etc.)” (Rabinow & Rose 2003, p.xviii, Foucault’s own words cited)

It is, in other words, not enough to choose side, and argue that this or that side is right or wrong; the scientific value lies in the argumentation, in the interpretation of the course of event. And this interpretation has to be “the better”, it is only through making “the better” interpretation the researcher is able to make a scientific contribution, which can come past “so what research”, which I shall return to below.

The second guideline by (Flyvbjerg 2001) is: “Placing power at the core of the analysis” (Flyvbjerg 2001, p.131). To do so, (Flyvbjerg 2001) presents some guidelines about how to understand power and how to make an analysis in which power is placed at the centre of the analysis, which draws on the works of Foucault. As I have argued above, I find it necessary to go back to Foucault’s own work, and operationalized his ideas on genealogy and archaeology for the analysis in this thesis, because by reading archaeology through genealogy, the importance of discourses can be integrated in the analysis to a higher degree than Flyvbjerg does in his guidelines which rests primarily on the genealogical works of Foucault. In chapter 5 I will discuss this in detail.

The third guideline is “Getting close to reality” (Flyvbjerg 2001, p. 132). Phronetic researcher should get so close to the empirical data, that their insights can make a difference in relation to society, and also reach a level where people will notice if the analysis is wrong. Phronetic researchers should thus not conduct “so what” research, which is the case, if, quote: “... the answer to the question “If you are wrong about this, who will notice?” is “Nobody.”” (Flyvbjerg 2001). The way to avoid this when studying contemporary issues, is that the researcher quote:

“... get close to the phenomenon or group whom one studies during data collection, and remains close during the phase of data analysis, feedback, and publication of results.” (Flyvbjerg 2001, p. 132)

This guideline arises because as argued earlier, the researcher cannot claim to speak from a special position in society. His voice is just one amongst many. The only way in which a researcher can thus make an impact on society, and hence do research, which is not “so what” research, is as argued earlier by making an detailed analysis, illuminating all the different views and perspectives and values present in a situation, and on the basis of such an analysis argue what ought to be done. And the way in which such an analysis can make an impact on society is by presenting a “better interpretation”. By presenting a better interpretation it gains validity. If it is accepted as valid among the people involved in the situation which is studied, and thus perceived to offer the “better” account of what is happening, whether it is desirable or not, and of what has to be done, then it also holds the potential to make people follow its conclusions. And this is basically the goal: to change things, then research moves beyond the “so what” phase.

The need to get close to the reality also means going into detail, and this is the point in the fourth guideline, which is “Emphasizing little things” (Flyvbjerg 2001, p. 133). The point here is, that getting close to the case requires “thick descriptions” and tremendous amount of source material, and in this regard (Flyvbjerg 2001) draws explicitly on the points made in (Foucault 1984a), as well as the works of Nietzsche:

“The focus on minutiae, which directly opposes much conventional wisdom about the need to focus on “important problems,” has its background in a fundamental phenomenological experience, that small question often lead to big answers. In this, phronetic research is decentered in its approach, taking its point of departure in local micropractices, searching for the Great within the Small, and vice versa. “God is in the detail,” the proverb says. “So is the Devil,” the phronetic researcher would add, doing work that is at the same time as detailed and as general as possible.” (Flyvbjerg 2001, p.133-134)

When the phronetic researcher investigates his case, he has to look not only at the overarching lines and issues, because if he does so, he will implicitly accept all the small accounts and assumptions which form the basis for the “large lines” in the case. If the researcher investigates all the small issues, then he finds also the small misunderstandings and errors, which can make the previous “better interpretation”, fall, and thus form the basis for a new better interpretation.

The fifth guideline is quote: “Looking at practice before discourse” (Flyvbjerg 2001, p.134). The argument here is that practice is more fundamental than discourse. (Flyvbjerg 2001) thus argued:

“Phronetic research focuses on practical activity and practical knowledge in everyday situations...

... What it *always* means, however, is a focus on the actual daily practices which constitute a given field of interest, regardless of whether these practices take place on the floor of the stock exchange, a grassroots organization, a hospital, or a local school board” (Flyvbjerg 2001, p.134)

The point is here to look at what people actually does, and investigate this, not only accept at face value what they say about what they do. One issue, when looking at this point in relation to Foucault’s work, is what Flyvbjerg means with practice. (Flyvbjerg 2001) argues, that when Foucault argues on the last page of (Foucault 1972) that “discourse is not life”, then he means daily practice is life, and that practice must be placed above discourse as the quote above shows. This is in contrast to Foucault’s argument inside (Foucault 1972), because in the discussion in this

book he states, that practice is part of discourse, as I will elaborate on in chapter 5. I will therefore read Foucault's work in the way that practices are part of discourse, and that a focus on both is necessary. My reading of Foucault is thus similar to (Jensen & Richardson 2004) reading of Foucault, where they also place language and practice within discourse.

The sixth guideline is "studying cases and contexts". This rule follows from the discussion of the importance of context in the discussion of phronetic social science above. Since no universal theories can be created, the only way open to the researcher is to study cases, i.e. specific events, occurring at specific points in time and space, and investigate how these emerged, through a focus on power. Foucault thus argued "never lose sight of reference to a concrete example" (Flyvbjerg 2001, p.135 Foucault's own words). The context of cases, local as well as global, is thus what gives cases both their meaning and their significance:

"The minutiae, practices, and concrete cases which lie at the heart of phronetic research are seen in their proper contexts; both the small, local context, which gives phenomena their immediate meaning, and the larger, international and global context in which phenomena can be appreciated for their general and conceptual significance" (Flyvbjerg 2001, p.136)

The seventh guideline is "Asking 'How?' Doing Narrative" (Flyvbjerg 2001). The question of how, is according to (Flyvbjerg 2001), central to Foucault. And if one poses this question, then narratives become central to the analysis, i.e. the story of the events and the actors involved, and the relationship between them. The narrative of the descent of the event in focus, i.e. how are the relationship between different preceding events, and thus what struggles, accidents and misunderstandings etc., led to the emergence of the event which is being analyzed? As mentioned earlier, the better interpretation is also what gives the validity. The researcher therefore has to construct a narrative, which presents a fulfilling interpretation of the emergence and descent of the object under study.

The eighth guideline is "joining agency and structure" (Flyvbjerg 2001). The argument here is that the researcher should strive to overcome the duality between actor and structure, between hermeneutics and structuralism and between voluntarism and determinism. As (Dreyfus & Rabinow 1983) discuss in length, a Foucauldian analytical approach does indeed overcome the distinction between hermeneutics and structuralism. Further, the way in which Foucault frames his analysis through a focus on power-knowledge relations, emerging at the micro level which may give rise to intelligible structures on the macro level, as mentioned in section 3.2, also means that he overcomes the distinction between actor and structure. Both the actors and the structures emerge, so to say, through the configuration of power-knowledge relations. This also has relation to the issue of voluntarism and determinism. One critic that is often leveled at Foucault is that his works are about how people are disciplined and shaped into specific subjects. Disciplinary practices were indeed the focus in (Foucault 1991), but Foucault made it clear throughout the book, that these practices were also something which was constructed in society. They were not given once and for all, as fixed entities which would exist forever. And in his later works focus was more on the agency of the individuals, for example in relation to the government of the self in (Foucault 2009). Consequently, a Foucauldian approach to analysis does not hold at the beginning neither ideas of voluntarism nor of determinism, the goal is instead to illuminate how structures and actors are constructed in specific situations which may give them more or less room for action.

The ninth guideline is "dialoguing with a polyphony of voices" (Flyvbjerg 2001, p.139). This guideline relates to the issue of objectivity. Since it follows from the works of Nietzsche and Foucault, as discussed in section 3.2, that there is no truth, and that the scientist therefore cannot understand himself as having a special standpoint which makes it possible for him to say the

truth, then objectivity becomes a matter of not speaking with one “true voice”, but instead articulating the different voices which comes together in a case. In other words, to articulate the different views existing within a case dealing with a specific topic (Flyvbjerg 2001). The researcher is, in (Flyvbjerg 2001)’s account also part of the context he is studying, and helps create this context through his studies.

It also follows from this, that since the “better” interpretation of the case is what gives validity to the argument, and objectivity comes from the illumination of all the different voices that are part of the case, then the interaction with the field under study is of key importance. The other guideline argues, that the researcher has to interact with his field, and this is because, that since no special place is reserve for the researcher from where he can speak the truth, and that the study instead has to gain validity and objectivity from the way in which other people in society receives the research, i.e. whether they find the interpretation of the case the “better” interpretation, then the interaction with the people in the case is necessary for getting the interpretation correct and thus establishing the “better interpretation” in which all the voices are heard.

The analysis in this thesis will, as the following chapters will reveal, be structured in a way, so that it complies with all of the nine guidelines discussed above, but before I turn to discuss the structure of this thesis in relation to the guidelines presented above, it is necessary to elaborate upon the use of case studies within phronetic research and the issue of generalizing from such in phronetic research.

4.3 Case studies and generalization in phronetic research

There are different approaches to case studies. In this thesis I will use Flyvbjerg’s approach, since his conceptualization of what case studies are, and how they can be used, fits logically with the phronetic approach to science. To present what a Flyvbjergian case study is, and how it can be used, I will take as my point of departure the five misunderstandings related to case studies that Flyvbjerg discusses in his works (Flyvbjerg 1998a; Flyvbjerg 2001; Flyvbjerg 2006). These are:

“Misunderstanding 1. General, theoretical (context-independent) knowledge is more valuable than concrete, practical (context-dependent) knowledge.

Misunderstanding 2. One cannot generalize on the basis of an individual case; therefore, the case study cannot contribute to scientific development.

Misunderstanding 3. The case study is most useful for generating hypotheses; that is, in the first stage of a total research process, while other methods are more suitable for hypothesis testing and theory building.

Misunderstanding 4: The case study contains a bias toward verification, that is, a tendency to confirm the researcher’s preconceived notions.

Misunderstanding 5. It is often difficult to develop general propositions and theories on the basis of specific case studies” (Flyvbjerg 2001, p.66-67 Original Italics)

What is interesting are the answers he gives to these questions, which he also summarizes is a number of precise points, and these are, in the same sequence:

“Predictive theories and universals cannot be found in the study of human affairs. Concrete, context-dependent knowledge is therefore more valuable than the vain search for predictive theories and universals” (Flyvbjerg 2001, p.73 Original Italics)

"One can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods. But formal generalization is overvalued as a source of scientific development, whereas "the power of the good example" is underestimated" (Flyvbjerg 2001, p.77 Original Italics)

"The case study is useful for both generating and testing of hypotheses but is not limited to these research activities alone" (Flyvbjerg 2001, p.77 Original Italics)

"The case study contains no greater bias towards verification of the researcher's preconceived notions than other methods of enquiry. On the contrary, experience indicates that the case study contains a greater bias toward falsification of preconceived notions than toward verification" (Flyvbjerg 2001, p.84 Original Italics)

"It is correct that summarizing case studies is often difficult, especially as concerns process. It is less correct as regards outcomes. The problems in summarizing case studies, however, are due more often to the properties of the reality studied, than to the case study as a research method. Often it is not desirable to summarize and generalize case studies. Good studies should be read in their entirety." (Flyvbjerg 2001, p.86 Original Italics)

It should also be clear from these points, that his answer to the five critiques follows from the phronetic approach to social science discussed in the previous sections, and the reason why I include these five misunderstandings and Flyvbjerg's answer to them at this point, is to use them as a starting point for the discussion about how to choose a case and the issue of whether or not to generalize the results from this case.

In the answers to the five misunderstandings Flyvbjerg argues that the "good example" is valuable, and that it is possible to generalize from cases, but sometimes not desirable to do so. He argues, that strategically chosen cases can be the most useful when it comes to creating knowledge:

"When the objective is to achieve the greatest possible amount of information on a given problem or phenomenon, a representative case or a random sample may not be the most appropriate strategy. This is because the typical or average case is often not the richest in information. Atypical or extreme cases often reveal more information because they activate more actors and more basic mechanisms in the situation studied. In addition, from both an understanding-oriented and an action-oriented perspective, it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently it occurs" (Flyvbjerg 2001, p.77-78)

And he further discusses different types of cases, the extreme or deviant case, maximum variation cases, critical cases and paradigmatic cases (Flyvbjerg 2001, p.79). The type of case has implications for the possibilities of generalizing from the case. As an example, a critical case is a case which makes it possible, quote:

"To achieve information which permits logical deductions of the type, "if this is (not) valid for this case, then it applies to all (no) cases" (Flyvbjerg 2001, p.79)

And as an example of a critical case Flyvbjerg draws a line to the experiment made by Galileo:

"Another example of critical case selection is the above-mentioned strategic selection of lead and feather for the test of whether different objects fall with equal velocity. The selection of materials provided the possibility of formulating a generalization characteristic of critical cases, a generalization of the sort "if it is valid for this case, it is valid for all (or many) cases." In its negative form, the generalization would be "if it is not valid for this case, then it is not valid for any (or only a few) cases."" (Flyvbjerg 2001, p.78)

This critical reader might ask here, how the dismissal of theories fits logically with the acceptance of the possibility to generalize from cases? To understand this we should focus on what is meant by generalization in relation to phronetic research. And in this regard (Spicker 2011) presents some interesting arguments. (Spicker 2011) draws on the work of both Flyvbjerg and others, and argues, that one issue which is found in the different discussion about what phronesis is, is the focus on action, the focus on “what to do” in a specific situation. This means that generalisations in relation to phronesis is about what to do, and is as such a different type of generalization, than the one which is linked to causal explanations, which is the core in the normal approach to generalization of theories, in the classical natural science ideal, i.e. the question: are the causal explanations found in this case the same as in every other case. (Spicker 2011) thus argues that:

“The problem is not generalization in itself. The major weakness of the kind of social science I have been considering is not that it tries to draw lessons, or even that it tries to find regularities, it is that it generalizes about the wrong sort of thing. The focus on generative mechanisms or cause and effect has often proved to be a blind alley; and the problem of walking down blind alleys in social policy is not just that we are wasting time, but that there are ideologues waiting with bludgeons who are determined to make sure that we stay there. If policy research needs to draw lessons, perhaps what we need to do is to reconsider the type of lessons we are trying to draw” (Spicker 2011, p.10)

The alternative is, of course, the kind of generalization, which is possible in relation to phronesis, i.e. the question about what to do. (Spicker 2011) makes the argument, that what can be learned from one case to another, what can be generalized, is not the causal mechanisms, but instead the rules of thumb about what to do in a given situation, it is, what he calls “precepts”. Examples of such precepts are, according to (Spicker 2011):

“Selective social policies characteristically fail to reach a proportion of the people they are indented to reach...

The private sector exercises adverse selection in order to limit cost...

Claiming behavior is affected by knowledge of services, negative attitudes to services and the cost of claiming...

There is an ‘inverse care law’ in health care which means that while people from lower social classes are in the greatest need, they are also least likely to receive services...

People whose priority is based on how long they have waited for services are better able to exercise choice than those priority is based in need...” (Spicker 2011, p.12)

(Spicker 2011) presents three characteristics of phronetic generalizations. The first is, that they are not specific, as is the case of generalization of theories where specific causal relationships are generalized, instead they are approximate:

“First, whereas causes are specific, phronesis is approximate. Even if a phronetic statement can be taken to apply broadly in a range of circumstances, it might always be wrong. Phronesis is concerned with guiding action, not simply with statements that are true or false. Because it is instrumental in its nature, a precept might be applicable even if it is not universally true – and, because phronesis is based in observation of particular circumstances, it probably will not be” (Spicker 2011, p.14)

This “approximate” nature of the lessons learned from phronetic research also show in the examples (Spicker 2011) gives, mentioned in the bullet points above. The first precept, for example, does not contain specific descriptions of for example how large a percentage of a given

population the policies will fail to reach. Secondly, the precepts are particular and based on investigation of empirical data. The knowledge embedded is therefore not theoretical knowledge, understood as principles and logical arguments, which has been tested on empirical data, but on the contrary, insights emerging from the analysis of empirical data. (Spicker 2011) thus argues:

“Second, where causal analysis is universal, phronesis is particular. Causes describe underlying mechanisms; phronetic generalisations are necessarily contingent on their context. Every insight, every precept, is based on experience. In economics, one begins with the core principle and tests it by changing the parameters. In phronesis, by contrast, we generalize the experience without making assumptions about underlying relationships. When variations in conditions lead to different outcomes, we qualify the generalisation.” (Spicker 2011, p.14-15)

The difference between the economic focus on core principles and the phronetic focus on the experience makes it necessary to return shortly to the critic of the economic approach to cluster studies I raised earlier. I argued earlier, that a problem with this approach is that it tries to explain the dynamics within clusters and their development through time by constructing universal theories building on relatively fuzzy concepts. With the point made by (Spicker 2011) we see an alternative approach opening up. If researchers of clusters chose the phronetic way, it could help the cluster literature out of the vain search for overarching theories explaining clusters, which apparently has haunted the cluster literature the last decade, where the number of concepts and theoretical explanations has exploded, but where our understanding of clusters at the same time has progressed relatively little as the confusion and conflicting claims in the literature clearly suggest.

I am suggesting here an approach to clusters, which is based on the question: what should we do in this situation?, and not on universal explanations of the “core principles” in clusters. The explosion of literature on cluster policy has shown the results of the weaknesses of the current theories explaining clusters. There are almost as much policy advice as there are theories, and just at the theories are sometimes conflicting, so are the policy advice. Some argue that specialisation is preferable in relation to cluster development, and therefore some policy papers argue for specialisation. Some argue for variety and therefore some policy papers argue for variety. I believe, given the points made about phronetic research, that time has come to abandon the search for universal theories about clusters, and as such the search for the theory which will explain all clusters, and accept that such cannot be created, and instead celebrate the fact that different types of clusters exist, each with different characteristics. A phronetic approach could therefore be the way forward, because by basing the cluster literature on this approach to science, we could imagine a further literature, which would be applicable for people in and around clusters who face the question: where are we going, and what should we do about it, if anything? The receipts in such a literature would be something like “for cluster characterised by (something) there is a tendency for (something) to occur”. If we imagine a cluster literature in which a large number of such prescriptions are made, then people in and around clusters would have better basis for action. And as such, this is the kind advice, or to phrase it differently, kind of generalization, this thesis aims to construct.

The point about celebrating the fact that different clusters exist, with different histories and different characteristics and different dynamics also has to do with the third point, which characterizes phronetic generalizations, which is the embracement of different experiences and the value of comparing these. (Spicker 2011) argues, that whereas the focus on causal relationships makes it necessary to cut away information to arrive at the “pure principles”, phronetic generalization moves in the opposite direction:

“Third, causal generalisations depend heavily on selection – cutting away information to look at the essential core. Phronetic generalisations, by contrast, generalise by cross-referring (or

triangulating) experiences from different sources, without eliminating inconvenient data.” (Spicker 2011, p.15)

These three characteristics of phronetic generalization has one weakness, or, to frame it differently, with the argument, that phronetic generalizations are approximate, are particular and are attempts to maintain the richness of the knowledge embedded in the empirical data, it becomes difficult to classify what good generalisations are and what bad generalisations are. To this (Spicker 2011) argues, that currently there are no definitive guidelines which can be used to clearly distinguish between good and bad generalizations. However, he presents some guidelines which he argues will help to differentiate:

“The first is that phronesis has to begin with evidence rather than theoretical inference...

... The second guide is that generalized statements need to be cross-confirmed by example...

... Third, none of the best precepts is deracinated...” (Spicker 2011, p.16)

With the fact in mind, that it is not possible to say with complete confidence what a good phronetic generalization is, it follows that it becomes questionable to make clear-cut conclusions in relations to phronetic generalization. Flyvbjerg are relatively clear in his argument, that critical cases can be used to create conclusions such as: if it does not hold in this case, then it holds in no case, or vice versa, as argued above. (Spicker 2011) argues for a more cautious approach:

“Phronetic generalization can in some circumstances be falsified by counterexample – Flyvbjerg sees this as a particular strength of case-studies (Flyvbjerg, 2001: ch. 6). More typically, however, because phronesis is dependent on particular situations, it can be difficult to show that a falsification applies more generally. What will happen is that the area in which the generalisations apply starts to shrink when different scenarios are considered, reducing what seemed to be a generality to the status of a special case” (Spicker 2011, p.16)

With this in mind, I think it is necessary to avoid the use of critical cases as a means to argue that the findings from one case holds in every other case, the way Flyvbjerg does. There are three reasons for this. The first is (Spicker 2011)’s arguments about the nature of phronetic generalisations, which are by nature relatively approximate precepts, and not true or false statements, as he argues, quote: “Phronesis is concerned with guiding action, not simply with statements that are true or false” (Spicker 2011, p.14). In this light Flyvbjerg takes the argument around critical cases a step further than it can bear, when he argues that critical cases makes it possible to say something about “every other case”. Secondly, Flyvbjerg himself also argues, that choosing a critical case is difficult:

“How does one identify critical cases? This question is more difficult to answer than the question of what constitutes a critical case. Locating a critical case requires experience, and no universal methodological principle exists by which one can with certainty identify a critical case. The only general advice that can be given is that when looking for critical cases, it is a good idea to look for either “most likely” or “least likely” cases, that is, cases which are likely either clearly to confirm or irrefutable to falsify propositions and hypotheses.” (Flyvbjerg 2001, p.78)

If it is impossible to know whether or not a case is indeed a critical case, it also means that there is always the possibility a case which is thought to be critical is indeed not critical for the object of the study, and this also points in the direction, that it is better to stay with (Spicker 2011)’s argument that it typically is difficult to falsify using phronetic generalisations. Thirdly, and finally, Foucault was as the first quote in this chapter showed sceptical of generalizing. He argued that the solution to one problem one specific place in time and space is not necessarily the solu-

tion to another problem another place in time and space, given that the context will always be different. And he was not searching for alternatives either for the same reason; he was doing detailed analysis of problematizations. The way to draw together the phronetic generalization and Foucault's work is by placing an emphasis on the problematization.

Foucault for example analyzed how certain discourses and practices came together in some specific settings in (Foucault 1991), for example in the workplace and in the army barracks, which gave rise to the problematization around the issue of discipline. Since his analysis this problematization around disciplinary practices has been used as a basis for analysis in several other settings within different academic fields. This approach of utilizing the problematization around disciplinary practices which Foucault analyzed in the context of punishment and prison, in other different contexts, is also a form of generalization. However, it is a generalisation that does not assumed that disciplinary practices will be present in every context where people come together, and neither is it one where exactly the dynamics Foucault discussed is argued to be present in the other situations. It is thus not a type of generalization which treats Foucault's findings as a universal applicable theory. It is a type of generalization in which researchers conducting research in different setting uses some of Foucault's problematizations as a starting point to investigate whether it is relevant to make similar problematizations in their specific cases. Understood in this light, Flyvbjerg adds the issue of whether the desired course is desirable or not, and if not, what should be done about it to the problematization. So instead of solely investigating whether similar problematizations can be useful to analyse in different contexts, it is, in phronetic research also a matter of asking whether the prevailing situation in these contexts is desirable and if not, what should be done about it. In other words, if similar problematizations are relevant in different contexts, then it could be plausible that the direction in these different contexts are similar, and this is either desirable or not desirable, and if not desirable, it could be that similar solutions should be used in the different contexts.

This section has now discussed why universal and predictive theories are not useful in social science, what the guidelines for phronetic research are, and how the issues of generalization should be understood in relation to phronetic research. It is therefore time to look at the structure of this thesis, and the rationales for this

Chapter 5: Methodology

The two previous chapters have now presented the parts of Foucault's analytical approaches and the phronetic approach which I will use as the basis for this thesis. Therefore, it is now time to discuss the structure of this thesis and thus how and why this thesis is framed as a piece of phronetic social research, and how Foucault's analytical approach is used.

As argued above, the choice of a phronetic approach entails an acceptance that specific context dependent knowledge is the focus. Therefore the research question which forms the basis for the research also has to be a specific contextual question. In chapter 1 I explained that the initial case study showed, that there was an 'us' amongst the employees in the TIDK organization, against a 'them' in the rest of the TI corporation. This 'us' apparently shaped the employees and their thoughts and behavior, and therefore I concluded that to understand the dynamics occurring when a global MNC enters a local cluster, it was important to investigate how this 'us' had emerged, and what the consequences were. And this was why I turned to the works of Foucault.

In chapter 3 it was argued, that what Foucault did was to analyze how people in society were constructed into specific subjects, and a person can, as argued, be seen as one subject in relation to sexuality, a different subject in relation to madness, etc. In this thesis the focus is placed on the construction of the subject as a worker in an organization localized in a local cluster, which becomes acquired by a global MNC. To make it clear, the object under investigation is the worker as a subject in an organization in a cluster; how is this subject constructed, into the specific subject he is, with a specific behavior in relation to his work? The focus is thereby not to investigate how the employees in such an organization are constructed as subjects in relation to their spare time activities, their political activities, their sexuality etc. The focus is only on how they are constructed as subjects in relation to their work in an organization located in a cluster. This focus demands attention to both the organization as well as the cluster the subject is constructed in. We have to understand both how the organization within which the subject works is constructed, as well as how the cluster within which this organization is located is constructed, in order to illuminate analytically the practices, discursive and non-discursive, which may influence the construction of the "working subject". I am here using the term "working subject" to emphasize that it is the subject in relation to work that is the analytical focus of the analysis. In the first chapter I framed this question as:

"How are people constructed as subjects within companies in clusters, which become acquired by MNCs, and how are the clusters of which they are part constructed as clusters?"

As can be seen this is a universal question, there is no link to a specific context. The only way to answer this question is therefore through construction of universal theories. Having presented the phronetic approach to social science in chapter 4, which argued that the use of universal theories is a dead end in social science and that focus has to be placed on specific context dependent knowledge. Following from this, it should be clear that no universal and predictive theories can be made about how subjects are constructed in organization in clusters which are acquired by MNCs. The only way to illuminate this issue is through a context specific question. It is therefore necessary to reframe the universal question, and thereby change the goal of this thesis, the goal is no longer to produce universal theories, but instead the goal is to produce context specific knowledge. The question must therefore be reframed to a phronetic perspective. It therefore becomes the following:

“How were the people within TIDK constructed as subjects, and how was the NorCOM cluster of which they were part constructed?”

The objective of this thesis thereby becomes to analyze how the people in TIDK were constructed as subjects, in relation to their work as explained above, and how the NorCOM cluster was constructed. Before I turn to how this question will be analyzed in a phronetic perspective, using the insights from chapter 4, it is necessary to dwell on some issues which the critical reader might ask to this research question.

Firstly, the critical reader might ask, why both the organization TIDK as well as the NorCOM cluster is the focus of this question, and whether this means that I with this particular formulation implicitly assume that the NorCOM cluster influences the way in which people within TIDK are constructed as working subjects? To this I will answer no. I'm not arguing that the cluster by default will influence the construction of the subject. It could be, that the fact that TIDK is located in the NorCOM cluster has no influence on how the people in TIDK are constructed as subjects in relation to their work. However, it could also be the case that it does influence them, whether or not this is the case has to be investigated empirically. Therefore I include in the research question both a focus on how people are constructed within TIDK and a focus on how the NorCOM cluster has been constructed, and it is up to the analysis to reveal the relationship between the construction of the cluster and the construction of the subjects in TIDK. The analysis of TIDK must include an investigation of how people in TIDK were constructed both as part of the larger organization TI, and as part of an industry with competitors, cooperation partners, suppliers, customers etc., as well as how they were constructed as part of an organization with relations to universities, trade organization etc., within a technological field, which also includes universities, research institutions etc. To uncover this field of discourses and practices influencing how TIDK and its employees were constructed I will use the genealogical and archaeological method, how I will do this will be the focus of section 5.2. The analysis of the NorCOM cluster must similarly include an investigation of the discourses and practices through which the NorCOM cluster as a concept emerged, and gained a specific existence and meaning. The approach to this analysis will be the focus of section 5.3. When these two analytical steps have been executed, it will be possible to analyze whether or not, and if so, how, the location in the NorCOM cluster influenced the construction of the subjects within TIDK. And thereby whether the 'us' in the TIDK case was a 'TIDK us' or a broader 'NorCOM us' or a mixture, and what kind of mixture. How this is done will be the focus of chapter 9.

Secondly, the reader might also wonder here, why I do not just investigate the impact of the localization of the NorCOM cluster in the analysis of TIDK, why I need to widen the focus and look firstly, at how subjects within TIDK had been constructed and secondly, also how the NorCOM cluster was constructed. This is because, as Foucault showed, discourses and practices shape what statements occur and which do not occur. Or put differently, the discourses, which include practices, surrounding subjects shape what they can say and think, and what they cannot say and think, as argued in chapter 3. By studying the people in TIDK and TI, and the discourses and practices within the organization shaping them as subjects, it is not possible to assess whether there are broader practices and discourses that are widespread in the entire NorCOM cluster, emerging in and around the cluster, which shapes what the subjects in TIDK can think and do, and what they cannot think and do, since the subjects may not be aware of this influence themselves, and therefore not capable of reflecting on it. The only way to analyze what discourses and practices that seep through the NorCOM cluster, if any, and if these influence the subjects within TIDK, and if they do, how they do, is to make the two analytical steps mentioned above. And on the basis of the results from these two analysis investigate whether or not the discourses and practices surrounding the NorCOM cluster have influenced the subjects in TIDK, and have been part of the basis for the construction of the 'us' within TIDK.

Thirdly, the reader might wonder in relation to this, whether the next step of the analysis should then be to analyze whether or not the discourses seeping through the NorCOM cluster are shaped by even broader discourses and practices in the region of Northern Jutland in Denmark, where the cluster is located. And subsequently analyse the impact of being located in Jutland etc. The only answer I can give to this is, that such a step could be interesting, and that most likely some of the discourses and practices characterizing the NorCOM cluster are influenced by discourses and practices found in the whole region, the country, Europe, etc. This however has to be left to future empirical investigations, and as it is outside the scope of this thesis. The goal is, as stated in chapter one, to investigate what happens when an global MNC enters a local cluster, more specifically how subjects are constructed in the interstice. Therefore the analytical focus is the cluster and the TIDK organization as part of TI. It is important to mention in this regard, that the use of the Foucauldian approach does not imply that the analysis can be understood using the concept of scale; that there are some discourses within the organization, which is placed within a bigger box, in the form of the cluster, which again is in a box i.e. the region and so forth, like in a Russian babushka doll. There are no scales, where practices and discourses are ordered in relation to each other in a categorical way, at different scales, instead, one discourse or practice at the organization level may have a relation directly to a discourse at country level. So the goal of the analysis is not to identify the relationship between discourses and practices at different scales, it is solely to identify the relationship between discourses and practices. This point can also be traced back to the argument Foucault made, that we have to dismiss the use of the categories normally used to group statements, such as the oeuvre of an author. The same goes for an organization within a cluster within a region within a country. These geographical scales cannot be used as a basis for an ordering of the discourses and practices which shapes subjects within the organization, but they can, and this is the important point, be used as starting points, or rather as spheres, in which the researcher search for the practices and discourses which shape the subjects within the organization in focus. When discourses and practices have been identified, they must be analyzed from a standpoint of their mutually constituting relationships, and not from the standpoint of what geographical scale they belong to. And in the analysis, drawing on the ideas from Foucault's genealogy, the strategy becomes to analyze the emergence and descent of the different discourses and practices shaping the subjects. This means that when the initial identification of the discourses and practices in the organization and in the cluster has been done, the next step becomes to analyze the emergence and descent of these. During this step it can be necessary to include, for example a focus on discourses emerging outside the cluster in the region, or in headquarters outside the region. The point is to analyze the emergence and descent of the discourses and practices which influence the subjects, and only these, and the emergence and descent thus become what constitute the boundaries of the analysis. What is part of the emergence and descent of the discourses and practices which influence the subjects and the construction of the cluster become important and must be included in the analysis. The following sections will elaborate on how this is done.

A fourth issue the reader might be wondering about, is why I choose TIDK and the NorCOM cluster as the two analytical focuses, when I am interested in the how subjects are constructed in the interstice between the cluster and the MNC. Why am I not choosing three analytical focuses: TIDK, the NorCOM cluster and the TI corporation, and thus also scrutinize how TI was constructed as a company through time, characterized by specific discourses and practices. The answer to this is the same as above in relation to the analysis of the region housing the NorCOM cluster. TIDK was a part of TI, but that did not mean, that TIDK was involved in everything which occurred in the TI organization, and further, given the amount of resources available for this PhD thesis, it was impossible to cover this step analytically. As I will elaborate on when I describe my data collection in section 5.1 and section 5.4, it was very difficult just to get access to TIDK and the management layer above TIDK in TI, i.e. in the European TI headquarter in Nice.

And the process I went through to gain access to just TIDK and the management layer over TIDK showed that it would be impossible to gain access to the top management level within TI, i.e. the president and vice presidents, which would be an indispensable source of data for such an analysis of TI. What I could do, was to investigate some of the most important interfaces TIDK had with the rest of the TI organization, for example through interviews with some of the key people in TI Nice and TI Dallas, the global headquarter, who interacted with TIDK. And through this source of data I was able to illuminate the discourses and practices in TI Nice and Dallas, and differences and similarities between these and the ones in TIDK. And from this data I could identify the practices and discourses within TIDK where the descent and emergence could be traced back to TI, and those that could not. Thereby I was able to analyze the impact of the TI organization on the practices and discourses which shaped the subjects within TIDK without going to the top of TI analytically. On a note, I can say, that one book where the authors do go to the top of the organization in focus is (Kristensen & Zeitlin 2005), but their goal is different from mine, as their aim is the development of the organization and the interaction between different subsidiaries and the headquarter, which makes an analysis of headquarter central to their work. My focus is on the construction of subjects within a subsidiary within a cluster, which is a different focus which renders the analysis of headquarter less important.

Having now addressed these issues, it is time to discuss how to frame this thesis as a phronetic piece of research, and therefore, refer to the discussion about phronetic research in chapter 4, add the questions about whether the “direction” was desirable and, if not, what should be done about it. I have decided not to include these two last questions explicitly in the research question formulated above, which were: “How were the people within TIDK constructed as subjects, and how was the NorCOM cluster of which they were part constructed?”. The reason for this is, that since this thesis is framed as a piece of phronetic research using the Flyvbjergian concept, there is an underlying assumption that a research question dealing with how something is constructed is not answered fully, before it has also analyzed whether the construction process, as it were or is, is desirable or not, and what should have been done, or be done, differently, if anything. I therefore do not find it necessary to include the two last questions explicitly in the research question, although they will be an integrated part of the analysis. I will later elaborate on how I incorporate the value issue in my analysis.

So how will I include the last two questions in the analysis, i.e. the questions “was these construction processes desirable?” and “what should have been done different”? The way in which I will approach these questions is through the use of problematizations, in the Foucauldian sense. Through a study of how people in TIDK was constructed as subjects, in relation to their work, and how the NorCOM cluster was constructed, I will identify “*problématiques*” that had the most impact on the people in TIDK as working subjects. To understand this argument, let me frame the discussion around what it means to be a “person in TIDK”.

I mentioned earlier, that focus is on how people in TIDK are constructed as subjects in relation to their work. So focus is on the people in TIDK as workers within TIDK, or to use another word, as employees. If we go to Oxford English Dictionary and look at the definitions of the words “worker” and “employee” we see that “employee” is a person working for a wage:

1. “A person employed for wages; = EMPLOYÉ, which it has now virtually superseded.
2. In U.S. often written employe.”

(www.oed.com 2011c)

If we look at the word “worker” we see some more nuances:

1. “One who makes, creates, produces, or contrives.
2. One who works or does work of any kind (sometimes with adj. denoting the quality of the work); esp. one who works *in* a certain medium, *at* a specified trade or object of manufacture, or in a certain position or status (often denoted by prefixed n., etc., as *boiler-worker*, *cloth-worker*, *iron-worker*, *metal-worker*; *co-worker*, *fellow-worker*; *brain-worker*, *hand-worker*); in early use also, a maker or manufacturer (of a specified thing).
3. Applied to apparatus or piece of machinery.
4. With adverbs, as *worker-up...*”

(www.oed.com 2011b)

A worker is a person who makes something, creates something, produces something, or contrives something. His work can be of varying quality and within different fields. In short, it is a person which does something. That a worker is someone who makes something, can be used to understand what role the problematization in Foucauldian terms plays in relation to understanding the construction of the subjects, because by problematization, Foucault meant, as specified earlier:

“... the ensemble of discursive and non-discursive practices, that make something enter into the play of true and false and constitute it as an object of thought (whether in the form of moral reflection, scientific knowledge, political analysis, etc.)” (Rabinow & Rose 2003, p.xviii, Foucaults own words cited)

What I will do in my analysis, is to analyse the discourses and practices, which makes it possible for something to enter into the game of “true and false” regarding the actions the people in TIDK do as workers, in other words, in relation to their work. Working is about doing something, but what is this something? This objective of the work, this something the people in TIDK must do, is something, which is constructed in TIDK, as the analysis will reveal. Let us have a look at some of Oxford English Dictionary’s definitions of work, which is:

1. “Something that is or was done; what a person does or did; an act, deed, proceeding, business; in *pl.* actions, doings (often collectively =3). *arch.* or *literary* in genetic sense.
2. Something to be done, or something to do; what a person (or thing) has or had to do; occupation, employment, business, task, function.
3. Action (of a person) in general; doings, deeds; conduct. (Often in collocation with word.) Obs.
4. Action involving effort or exertion directed to a definite end, esp. as a means of gaining one’s livelihood; labour, toil; (one’s) regular occupation or employment.
5. A particular act or piece of labour; a task, job. Also gen. something difficult to do, a ‘hard task’ (cf. 4b); or in special connections, e.g. a particular operation in some manufacture. Obs. exc. Hist.
6. Trouble, affliction; in later use in lighter sense: Disturbance, fuss, ‘ferment’. (See also 31)

7. Math. The process of or an operation in calculation; a process of calculation written out in full; = WORKING n.7. Now rare or Obs.
8. Physics and Mech. The operation of a force in producing movement or other physical change, esp. as a definitely measurable quantity: see quotes.

....”

(www.oed.com 2011a)

Work is, as can be seen, something which is or was done, a process, an action which involves some effort, the execution of a task. I can hereby specify what I mean by being constructed as a subject in relation to work, it is the construction of the people as subjects in relations to the acts and doings these people do in relation to TIDK. The object of the analysis thus becomes to investigate the discourses and practices which makes it possible for the people in TIDK to work, and be workers, or in other words, to be working subjects. The practices and discourses that is, which constitute the people as workers, with a work to do, with some tasks to do, in relation to TIDK, i.e. some specific tasks, actions, labours they must execute in relation to the company TIDK, from which they get a salary, to specific quality standards etc. as workers.

In the analysis in this thesis I will thus illuminate the discursive formations, consisting of discursive and non-discursive practices, around the people in TIDK which makes them workers, through which it is constructed what they should do and should not do. In other words, how their work tasks are constructed as well as how their behaviour and approach to the work is constructed, and as such how they are constructed as subjects in relation to their work. Value of true and false also enters the scene in this regard, because through the power-knowledge relations in the discursive formations it is not only constructed what the work is, i.e. the things the people should do, it is also constructed what the right and what the wrong way to behave in TIDK is in relation to the work.

Some might think that these are management issues, managers decide what should be done and what should not be done, and how, etc., but since my question is “the people within TIDK” my focus is both on people employees as engineers as well as people employees as managers. Therefore I also aim to capture the discourses and practices influencing the behaviour of the managers in the analysis. The objective thus becomes to analyse how it was constructed what these people, engineers of different kinds as well as managers, in TIDK, should do and not do, as workers in TIDK. There were no fixed rules, no fixed knowledge, as the case study will show, about what people in TIDK should and should not do. Their work tasks were constantly constructed through different practices and discourses, and it was these practices and discourses that constantly shaped the people in TIDK as working subjects, and it is these practices and discourses which are the focus of the analysis. How this will be done analytically, I will dwell on later in section 5.2, section 5.3 and section 5.4. The analysis in the case study will, in other words, using the methods developed in section 5.2, section 5.3 and section 5.4, will identify the problematization through which the subjects in TIDK located in the NorCOM cluster were constructed in relation to their work.

The scientific contribution of this thesis is to identify and describe this problematization, so that other people in other clusters in the future may remember to think of the specific dangers this problematization illuminated. I do not argue that the specific problems illuminated in the specific cluster investigated in this thesis will also be problems in other clusters, I do not even argue that the solutions which were used in this specific cluster will work for other people in other clusters, I simply raise a flag to create awareness about these problems, and hope that other

people in other clusters will at least reflect on whether these problems may also be issues in their situations.

What is generalizable from this thesis is thus not the “solutions”, but aspects of the problematization I identify. Let me elaborate: The identification and description of the problematizations in the analysis will show that during the history of TIDK a number of events occurred which shaped the history of the company and the construction of the subjects within it. In the discursive formations surrounding TIDK it was not fixed completely what these events were, a number of different paths were open at different points in time in the history of the organization, and some choices were made, some random events occurred and some misunderstandings occurred etc. When looking back on all these choices, this fragile history which made TIDK and the subjects within it what they were, it is impossible to say, that the history, as it unfolded, was either good or bad. It cannot be said, in other words, that the course TIDK had through time seen as a whole was good or bad. Because to make that judgement would imply that the organization had some kind of “pure essence” or a “nature”, that there were some thing binding the events constituting the fragile history of TIDK together as a unity, with certain characteristics which can be deemed good or bad. This was exactly the kind of conclusions Foucault warned about in his discussion in relation to genealogy, when he argued that we should dismiss a search for the pure origin of things, as discussed in chapter 3. Does that mean that I here dismiss (Flyvbjerg 2001)’s three value questions? No, because I do not think Flyvbjerg’s point is to conclude whether the whole course, or in my case, the whole history of TIDK, unfolded in a way which was desirable or undesirable, because, such a conclusion is too polarizing, and misses all the choices, struggles and accidents along the way. What can be analysed instead is what events, decisions, accidents and misunderstanding that are, along the way, that seemed desirable and which that did not. The point becomes thus not to argue that the whole story of TIDK was either desirable or not, and in the case of not, what should have been done different, so that a different desirable story could have unfolded. The point is instead that there are always alternatives on a given course, and all alternatives, no matter what course one chooses, will involve problems. There is no “right” and frictionless course which is opposed to a “wrong” and problematic one. There are problems in all courses, and no matter what course one chooses, one has to analyse the difficulties it involves. I believe that this was exactly what Foucault meant, when he argued that everything is dangerous:

“... My point is not that everything is bad, but that everything is dangerous, which is not exactly the same as bad. If everything is dangerous, then we always have something to do.”
(Foucault in interview, cited in Dreyfus & Rabinow 1983)

The important point in this is the argument that “we always have something to do” and this is also why I presented this quote at the start of this part of the thesis. The point is that the researcher should always question the course of society in relation to whatever focus is chosen, be that the treatment of madness or the penal system, and analyse the dangers inherent in the situation. And I think, that this is also exactly what (Flyvbjerg 2001) meant, when he argued that one has to pose the questions about whether the course is desirable and if not what should be done about it. His point was not to judge the complete history with which the analysis deals, and replace it with an account of what should have been instead, and alternative history. It is to analyse how this history could have been different through a focus on all the small decisions and events which along the way created the history. This is the reason for the argument that the devil is in the details, as discussed above. And this is why the Foucauldian notion of problematization becomes central. My project is an analysis of TIDK and the NorCOM cluster, and this analysis will identify and describe the discourses and practices which had an impact on the subjects within TIDK, and on the history of TIDK as well as the history of the NorCOM cluster. The phronetic judgement following this analysis will therefore not argue whether the histories we

saw unfolding in relation to TIDK and its employees and the NorCOM cluster were desirable or not. The objective instead becomes to highlight the problematic parts these two histories contained, and articulate them. And this is why the thing that can be generalized from this story is the problems, and not the solutions.

Therefore the goal with the analysis cannot be to argue that the history which unfolded was undesirable, and should have been replaced with another desirable course. The objective is instead to illuminate the parts of the history that were problematic or constituted a tension in the story. Therefore I do not include the two questions of whether the course was desirable and if not what should have been done different in the research question above. But they are central to the answer to the question above, because they become an integrated part of the analysis through the focus on the small details and the problems and tensions identified in the analysis.

To frame how this thesis constitutes a piece of phronetic research I will now turn to the guidelines for the phronetic approach which were presented in chapter 4, and discuss how they are used in this thesis. The first guideline was to put values at the centre of the analysis. In the discussion above I argued, that in this thesis the value question will be included in the analysis of the problematization through which the people in TIDK was constructed as working subjects and the NorCOM cluster was constructed as a cluster.

The second guideline discussed above was, that focus should be placed on power in the analysis. When the case study started, the focus was on learning, not power. In other words, as stated earlier, when the case study started, it grew out of an abductive design; the use of a case study methodology was thought into the abductive research design, and the goal was to analyse how dynamics related to learning changed, as the local organization ATL Research was acquired by TI. As the case study progressed, and I got into details with TIDK, I realized, that a focus on power and on how the people in the organization were shaped as subject were important. And this was also the point where I changed the case study fundamentally. Instead of doing a "case study" I chose to do a case study based with a Foucauldian approach to power. This was the fundamental change, which placed power, conceived according to Foucault's ideas, at the centre of the analysis, and thus bought it closer to Flyvbjerg's phronetic approach to social science.

The analysis in the case study will also be conducted in a way which follows the points discussed in relation to the guidelines above. It was discussed above, that phronetic research focus on cases, and get close to reality and explore all the little things. I have strived to go into detail with the empiric data in the case study, and explore all the small details. As the discussion about the empirical data used, in section 5.4, will show, I have used a number of different sources: interviews, observations, documents of different kinds, minutes from meetings, scientific reports and papers and newspaper articles. As I collected data and analyzed these, I also constantly engaged with people in and around TIDK and the NorCOM cluster, people that are in other companies in the cluster, people who have been members of the NorCOM cluster association as well as people in different institutions influencing the cluster, for example, the local university and the local science park. This has been done to make sure that my interpretations were in accordance with the different views expressed in the case. My interpretation is thus constructed in interplay with the empiric field. I have in the analysis further tried to value both practice and discourse, since my reading of Foucault is that the two cannot be distinguished. In the first step of the analysis, the approach is relatively more inspired by genealogy, compared to the second step, which is more inspired by Foucault's archaeology, as section 5.2 and section 5.3 will elaborate on. This means also, that practices are relatively more in focus in the first step, while discourses are more in focus in the second step of the analysis.

As can be seen in the chapters dealing with the case study I have also strived to use narratives. In his analysis (Flyvbjerg 1998b) presents one big narrative, with a timeline, a plot, certain events, a beginning and an end. Due to the situation around the collection of my empirical data, which I will elaborate on below, it has not been possible to make one grand narrative in this thesis. The thesis therefore presents a number of different narratives. First there are two narratives about TIDK, one describing TIDK as it changed over time as seen from within TIDK and one describing how TIDK changed over time as seen from other sites within TI. These narratives have been worked through several times, shown to people within TI, discussed with people within TI, and finally cleared for publication by people within TI. This means that I have strived to go into details with these accounts, and illuminate all the small details, and also present the “better interpretation”. As argued an investigation of the discourses and practice through which the NorCOM cluster was constructed, which TIDK was a part of, is also necessary to understand in detail how the people in TIDK was constructed as subjects, and this will be the objective of a third narrative in chapter 8. This chapter explores the ways in which the NorCOM cluster was constructed. Finally, the combination of these narratives will in the discussion in chapter 9 form the basis for a fourth narrative. I have furthermore tried throughout these analyses to make sure in the design of the data collection, as well as in the analysis of the data, that I am “dialoguing with a polyphony of voices”. Practically, this means, for example, that in the analysis of TIDK I made sure to interview engineers, middle managers and top managers in TIDK as well as engineers and managers at other TI sites, and the top managers located the level above TIDK. And not only did I make sure that these were heard in the data collection, I also tried to present their different perspectives on issues in the narratives presented in this thesis. Often some managers argued that a given practice did not make sense, while other thought it made perfect sense, and in such cases I have strived to present both views of the issue, and thereby make sure that “all the voices” on the matter were heard. The same holds for the analysis of the NorCOM cluster, where I discussed my analysis and conclusion with the key people in and around the cluster organization, to make sure that I had identified all the details as well as the different views of the issues I identified in the analysis. This approach to the case study also means that the validity of this thesis builds on the quality of the interpretation, and by engaging with the people in my case throughout the work on the case study, I have sought to make sure that my interpretation is valid. The objectivity of my analysis stem from the fact that I have sought to identify, describe and analyze all the different voices heard in the case.

Regarding the guideline about joining agency and structure, I have tried throughout the analysis to make sure that I keep neither agency nor structure fixed. The structures emerging in the case study, such as the discourses around the NorCOM cluster is treated analytically as a construction emerging from the interplay between different actors, and at the same time, the actors are seen as being constructed in the interplay between different discourses and practices. This thesis thereby fulfills the guidelines for phronetic research, and importantly, I will also claim, that the result is a piece of phronetic research, refer to (Flyvbjerg 2001)’s point that it is not about the methods used, it is about getting the results right.

The use of the phronetic approach to science of course also means that it has been necessary to leave some discussions out of this thesis, and let me now turn to these. These are the discussions dealing with constructions of theories about the development of clusters, their evolution or their life cycles, because their goal and their approach to science is incompatible with the understanding of science which underscores this thesis. To illustrate this, let me take as my point of departure one of the discussions in the cluster literature which has gained attention in recent years: the discussion of variety vs. specialization in relation to regional development.

Whereas the contributions of (Porter 1998a; Porter 1998b) is an argument in favor of specialization within clusters, other and newer contributions such as (Boschma & Iammarino 2009) argue

in favor of variety. One piece of feedback I have received on the research in this thesis, is that the result of the case study can be read as an argument in favor of the variety argument, i.e. that this case study showed that the focus on 2G and 3G telecommunication technology became a problem in that other business areas were not explored. Philip Cooke, one of the authors which has played key role in the discussions about regional innovation systems as argued in section 2.1.1, therefore suggested when I discussed this thesis with him, that I should discuss this in the thesis, and thus bring in the variety literature. I agree that the case study showed that in *this case*, specialization in some circumstances became a weakness. But, and this is the important thing to note, due to my approach to the case study, and my acceptance of the meaning of context, as described above, I will not bring in the theories on variety in relation to regional development, because this would go against the scientific approach in this thesis. The thesis explores the actual context in my case, which is special to this case, and therefore the only conclusion that can be drawn is that in this case that value placed on specialization was apparently, according to some views, a problem. But this does not mean, in any way, that it is possible to say with this study as the point of departure, that this supports a universal theory arguing that variety is preferable in relation to clusters. What I will do instead is to conduct my analysis using the Foucauldian analytical approach and then when I have discussed the results of the analysis in chapter 9, I will return to the conventional cluster literature and try to meet this, by discussing my approach and my results in relation to the conventional cluster literature.

So I have decided to leave out the cluster theory as the analytical basis for this case. What implications does this have for the construction of the thesis? How can I then say, at all, that what I am studying is a company in a cluster? From my perspective the cluster becomes something which is constructed through discourses and practices. The cluster thus also becomes a dynamic and constantly changing entity, which is always rearticulated and reconstructed through different discourses and practices. This means that the cluster is not conceptualised as an entity which goes through a specific development, or a life cycle specified in cluster life cycle discussions. I am also dismissing the evolutionary approach to clusters, given Foucault's critique of the evolutionary concept, refer to chapter 3. A cluster thus exists as an articulation among different actors at a given point in time and space. If something is seen by people within, as a cluster, and by people outside, as a cluster, then it is a cluster, and the question then is what the basis for this articulation is. What is and what is not then? If it is can be shown that something is articulated by people or organizations or institutions, or all of these, as a cluster, then we can say that in relation to the discourse, then it is a cluster. This can be researchers, business people, etc. This is a very important difference between normal cluster approaches and mine. I do not try to analyze, using scientific definitions of clusters, what is and what is not a cluster. I do not take (Porter 1998a)'s definition of clusters and analyze whether a given cluster fulfills this definition; I simply take the discourses existing at a given point in time and space at face value. If it is articulated, be that in scientific works, the media, or both, or somewhere else, that something is a cluster, then it is a cluster, and then my focus becomes to analyze how this "something" became a cluster. And what this something is, i.e. this cluster, which is constituted through discourses and practices, how does this exist in the web of power and knowledge?

The relationship between power and knowledge also becomes important here, because as emphasized by Foucault, there is no such thing as objective truth. Truth is what it is constructed to be, and multiple conceptions of truth can exist at the same time. Therefore it is not interesting to test whether or not something is a cluster. It is actually impossible to say with any confidence whether something is really a cluster. The only starting point which is open is therefore to look at discourses and analyse whether or not 'something' is articulated as a cluster. The next step is thus to analyse how this 'cluster' emerged in the discourses. What is the descent and emergence of this articulation? What is the cluster so to say? Or in other words, how does it exist in the field of discourses and practices stretched between different force relations. Or in yet other words,

what are the power relations which make the articulation that a single cluster exists possible. This becomes the object of the study, and in the unravelling of the emergence and descent of the cluster the analysis of the role of local dynamics and global dynamics become part of the analysis.

This makes my approach fundamentally different from the majority, if not all, approaches currently found in the cluster literature. In this literature clusters are often seen as a passive capability, because it is argued, that cluster in some way enhance the capabilities or competitiveness of firms, through a series of dynamics, most often relating to knowledge. But these dynamics are treated as something which automatically occurs, as something rational in the cluster. What has not been pointed out clearly enough is that it is in fact different actors with different strategies which who come together in so-called cluster associations or clubs or environments. The literature on cluster policy initiatives clearly suggests that someone are trying to do something to support, or at least, influence, the development of clusters around the world. One is therefore forced to accept that if clusters are more than some dynamics related to learning which occurs in the intersection between companies located in clusters, if clusters are indeed something which can be influenced by cluster initiatives, launched by different actors, be that business people starting cluster associations or clubs, or politicians using different cluster support initiatives, then it becomes relevant to ask; how is the cluster constructed. The complexity in this regard is that many strategies and goals influence the processes within and around a given cluster. My approach presents a methodology which makes it possible to study this complexity of interaction between different actors pursuing different goals and strategies through an analysis of discourses and practices.

The cluster I analysed in the case study in this thesis was, when I began work on the thesis in 2006 articulated in several scientific papers as a cluster, the publication dates of these span 13 years. It had been mentioned in number of newspaper articles since the mid 1990s. There was a consensus among a significant number of people in the companies constituting the cluster, that it was a cluster. A cluster association existed which articulated the cluster as a cluster, through a webpage as well as through brochures etc. Companies in the cluster argued in presentations and on their web pages, in some circumstances, that they were part of a cluster. And among a number of researcher within economics and economic geography, around the world, the cluster was known from different scientific publications, articles, reports, and conference proceedings, and it was accepted that the cluster was indeed a cluster. It was, as one of these researchers put it to me, not necessary to discuss whether or not it was a cluster in new scientific works, it was only necessary to make reference to some of the earlier works dealing with the cluster, because these already showed this. It had, by then, within scientific circles, moved from a cluster where it was discussed whether or not it was a cluster, and had become a cluster in which different cluster dynamics were studied. That it was a cluster was not something people had doubts about. My question, small and humble, was: how did this cluster become a cluster? I am not interested in what some economic geographers or economists may think when they hear this question, which is: Why are these companies here. Or, is this really a cluster given the literature and definitions of clusters? No, I am only interested in: How come it is articulated in different discourses that a cluster exists? And to answer this I am forced to analyse how the idea of this "something" as a cluster emerged in different discourses and practices, and how this argument gained momentum in different discourses and practices. Let us think about this for a moment. A researcher might say that something is a cluster. A business man might say that it is a cluster. A local politician might say it is a cluster. A newspaper article might say that this is a cluster. But what are the force relations that make this possible? How did the situation emerge in which something, in a form of a collection of companies etc. was articulated as a cluster? Why was it articulated as a cluster and not something else, say an industrial district? These are the important questions

which a cluster analysis building on the ideas developed by Michel Foucault is capable of illuminating.

It is now time to turn focus to the choice of case and the construction of the analytical framework which will form the basis for the analysis which will answer the research question.

5.1 The choice of case

When the case TIDK in the NorCOM cluster was chosen as the case in this thesis, it was done using an abductive research design, and theories on learning and cluster. Let me therefore now turn to the rationality for this choice.

5.1.1 The choice of cluster

Given the initial goal of this thesis to illuminate how MNC acquisitions influenced learning dynamics within local clusters, i.e. how the localness of the cluster and the globalness of the MNC came together in the learning processes in acquired organizations, and the widespread use of case studies in the literature on learning in communities of practice, I decided to carry out a case study of learning processes within one cluster. The first requirement for the case cluster was that learning, and thereby knowledge creation, should be key issues in the cluster chosen. The second requirement was that there in the cluster chosen should be companies which had been acquired by MNCs. This would make it possible to study the learning occurring in the interstice between the local cluster and the global MNC in a way which could shed more light on the relationship between the local world inside the cluster, and the global world outside the cluster, than existing contributions dealing with for example the concept of buzz and pipelines were capable of.

Let me start with the first requirement for the case. There are differences between industries, some are more reliant on innovation and learning than others, and therefore I decided to choose a cluster in an industry which was reliant on learning and innovation: the wireless telecommunication industry. The telecommunication industry has experienced a relatively large and fast technological development from the first analogue generation of mobile phones, the NMT phones in the 1980s, to the second digital generation of phones, the GSM phones and to the current third generation of phones, the UMTS phones (Dalum, Pedersen, & Villumsen 2005; Levinthal 1998). The current technological development can be seen as a convergence between communication technology and the computer technology⁴ (Steinbock 2005).

R&D activities within the telecommunication industry take place in complex networks between the players in the industry. These players include: network operators such as Vodafone and T-mobile; equipment manufacturers such as Nokia, Motorola, Samsung, Sony Ericsson and LG; and semiconductor companies such as Texas Instruments, Qualcomm, Analog Devices, Infineon and Freescale Semiconductor, as well as numerous smaller R&D companies.

Because of the technological development in the industry from an era where a mobile phone was “just” a telephone which was portable, to the situation today where a mobile phone is a complex device, new technologies have become important in the industry over time, and hence the nature and structure of the industry has changed over time. At the start of the 1980s it was possible for a handful of engineers to produce a working NMT mobile phone. From generation to generation, however, the complexity and cost of developing a phone have risen, and it is esti-

⁴ This is for example illustrated in commercial advertising. Motorola refers to mobile phones as “the device formerly known as the cellphone” (Steinbock 2005) and in 2006 Nokia presented their new Nokia N95 with the line “It’s what computers have become” (www.nokia.com 2007)

mated that the cost of developing a phone and the complexity of phones have risen 20-30 fold from one generation to the next (Dahl, Pedersen, & Dalum 2005).

The development of the industry is apparent in a number of changes in the characteristics of the industry. For example, in the 1980s relatively small firms could produce mobile phones and compete in the market whereas today only large companies are able to compete. Another example of the development is the changes in the division of labour between network operators, handset providers and semiconductor companies. Apparently parts of the technical R&D behind a mobile phone have been moved from the equipment manufactures to the semiconductor companies. In the 1980s a semiconductor company could produce a chip and a datasheet describing the chip and then sell it to equipment manufacturers. Today, semiconductor companies have to design a phone with all the components and software necessary to make it work, in technical terms they have to create a reference design. Then they have to get this reference design evaluated, and first when it has been proven that the reference design can pass the tests posed by network operators, is it possible for the semiconductor company to sell the design to equipment manufacturers who will use this and thereby the chips (described in the reference design) produced by the semiconductor company.

Given the relatively fast-moving technological development in the wireless telecommunication industry, and the importance of innovations in this industry, it is plausible to assume that learning and knowledge is important within this industry. Therefore I chose a cluster for my case, which was a cluster consisting of R&D companies within the telecommunication industry; the NorCOM cluster.

The NorCOM telecommunication cluster has been described and analysed in numerous scientific publications since the late 1980s. In the early contributions it was conceptualized as an industrial milieu and as an industrial district (Dalum 1993; Gelsing & Brændegaard 1990) and in later contributions as a cluster, see for example (Dahl, Østergaard, & Dalum 2010; Dahl & Pedersen 2001; Dahl & Pedersen 2004; Dahl, Pedersen, & Dalum 2005; Dalum 1995; Dalum et al. 1999; Dalum, Pedersen, & Villumsen 2002; Dalum, Pedersen, & Villumsen 2005; Dalum & Reinau 2006; Lorenzen & Mahnke 2002; Østergaard, Dahl, & Dalum 2007; Stoerring & Dalum 2007).

The conventional story of the NorCOM cluster, which will be analyzed and re-written in detail in the analysis in the chapters 6 to 9, is shortly put the following: The story of the NorCOM cluster goes back to the 1940s with the start of the company SP Radio. Dancom was started in 1973 by engineers from SP Radio, and functioned as the seedbed for Shipmate in 1977 and Dancall in 1980. Shipmate focused on maritime communication equipment, Dancall on mobile communication equipment (Dalum 1995). The start of Dancall coincided with the takeoff of the first generation of mobile phones, the NMT phones (Dalum, Holmén, Jacobsson, Praest, Rickne, & Villumsen 1999), and in the mid 1980s Shipmate established Cetelco as its mobile telephone subsidiary, which led to fierce competition in the cluster. In the late 1980s the standard for the second generation of mobile phones, the GSM standard, was created and it became clear, that development of GSM terminals and infrastructure would be considerably more expensive than the development of NMT terminals and infrastructure. Dancall and Cetelco therefore formed a joint-venture company in 1988, DC Development, with the aim of developing GSM terminals (Dalum 1995; Dalum, Holmén, Jacobsson, Praest, Rickne, & Villumsen 1999). DC Development succeeded, and in 1992 Dancall and Cetelco presented working GSM terminals. This was at the same time as large multinational leaders such as Nokia, Ericsson and Motorola did (Dalum, Holmén, Jacobsson, Praest, Rickne, & Villumsen 1999). This development left both companies with economic problems. DC Development was therefore closed in 1992. Cetelco was acquired by Hagenuk in the period 1989-1992, and Dancall was bought by Amstrad in 1993 (Dalum 1995; Dalum, Holmén, Jacobsson, Praest, Rickne, & Villumsen 1999). Thereby the character of

the firms in the cluster began to change. Up onto the time of the 2G phones companies in the cluster were mainly small and medium sized Danish owned companies, the most important ones were Dancall and Cetelco. In the latter part of the 2G life cycle this changed and many companies became subsidiaries of large MNCs. This means that from the late 1990s to the middle of the 2000s many of the great players in the field entered the cluster, and a number of these did so through acquisition (Dalum, Pedersen, & Villumsen 2005;www.norcom.dk 2008). The companies in the cluster all focused on work within the telecommunication industry, and most of the companies are R&D companies. By the middle of the 2000s the majority of the companies were subsidiaries of large MNCs, and both big players within the handset industry and big players within the semiconductor industry were present.

To sum up, the cluster chosen as case cluster was the NorCOM cluster in Northern Jutland, Denmark. The choice of this cluster was driven by two rationales: Firstly, that the cluster consisted mainly of R&D companies within the telecommunication industry, this meant that learning and knowledge development must be assumed to be the key focus in the cluster, which meant that there should be rich opportunity for studying processes related to learning and knowledge in this cluster. Secondly, that the cluster was a cluster in which a number of MNCs had entered through acquisitions, meaning that it was possible to study the impact of such acquisition in this cluster, i.e. the interplay between the local cluster and the global MNC in relation to learning processes in the acquired organizations. Furthermore, adding to the choice was the fact that I had contacts within the companies in the cluster developed through my work for my master thesis, which meant that I could gain access to some of the companies.

The next question was how to illuminate how learning occurred in the interstice between the local NorCOM cluster and the global companies? Given that the NorCOM cluster contained a number of companies which had been acquired by MNCs, of which some had been small locally owned companies before the acquisitions, whereas other had already been owned by other MNCs before the acquisitions, I decided to study one of each of these cases. The rationale for choosing both a local company which was acquired by an MNC and an subsidiary own by one MNC which was acquired by another, was that it was impossible beforehand to evaluate whether there would be differences between these two types of acquisitions. The strategy of the case study was to investigate in detail at the micro level how the acquisitions had changed these companies, with a special focus on the learning processes. Additionally, the rationale for only choosing two companies was that the resources needed for such in-depth studies meant, that the resources available for this thesis could only be stretched to two cases. Let me now turn to the initial choice of companies.

5.1.2 Choice of case companies in the NorCOM cluster

To illuminate how the MNC entry had influenced learning processes within the NorCOM cluster, I chose two companies for detailed studies. The idea was to analyse how the local cluster and the global MNC came together in the learning processes within two such acquired organizations. The idea was, that by studying the learning processes occurring in the interstice between the local cluster and the global MNC within the MNC subsidiary, and comparing these processes to the learning processes that had been in the organization before the acquisition, through interviews with employees, I would illuminate how learning occurred in the interstice between the local cluster and the MNCs in more detail than previous studies had done. And thereby be able to present a more elaborate account of how learning occur in the interstice between the local cluster and global MNCs than other contribution had done by 2006, for example the contributions dealing with buzz and pipelines in clusters (Bathelt, Malmberg, & Maskell 2004;Maskell, Bathelt, & Malmberg 2005).

This raised the question of how to choose companies, what characteristics should be the basis for the choice? Besides the before mentioned rationality of for choosing a case company which was a local company before the MNC acquisition as well as a company which was already owned by one MNC before the acquisition by another MNC, another rationale was to choose cases which captured what the NorCOM cluster was. The objective was, as mentioned in chapter 1, to investigate what happens when the global MNC meet the local world in the cluster, and therefore I tried to choose companies which were part of the local world within the cluster. I had written my master thesis on the NorCOM cluster and I had interviewed a number of people from companies in the cluster, as well as people from the NorCOM cluster association. In the initial phase of the work on this thesis I further interviewed a number of people in the cluster to create an overview of what the companies in the cluster were doing, and which companies that was working which what etc. On the basis of this knowledge, I chose Texas Instruments Denmark and Motorola Denmark.

It seemed that TIDK was a company deeply embedded in the NorCOM cluster. ATL Research, which was the company Texas Instruments acquired, had been founded by people who had worked in Cetelco, and who thus were part of the network of old colleagues in the cluster who knew each other from Dancall and Cetelco and DC Development, a network I will elaborate on in chapter 8. The CEO of TIDK was active in the NorCOM association, and also a person who wanted to support research at the university, and thus also willing to open the doors of TIDK for a research project. And finally, the data which I collected also indicated that apparently TIDK's work areas as a subsidiary of a semiconductor MNC within the NorCOM cluster was similar to the work other subsidiaries of semiconductor companies in the cluster was doing.

In relation to Motorola, it was described in the research litterateur dealing with NorCOM, that there were a network of old colleagues in the NorCOM cluster, which was very important for knowledge diffusion etc. within the cluster, and that this network originated mainly at Dancall, where the old generation of engineers in the cluster had worked together, before they moved on to other companies in the cluster (Dahl, Pedersen, & Dalum 2005; Dalum 1993; Dalum 1995; Dalum, Holmén, Jacobsson, Praest, Rickne, & Villumsen 1999; Dalum, Pedersen, & Villumsen 2005; Gelsing & Brændegaard 1990). I will therefore argue, that Motorola's heritage from Dancall meant, that if there were a special "NorCOM" practice in relation to learning, which were found in the "local NorCOM cluster", then this company should be part of it, or at least, it should have been, and the case study could then illuminate when and how the NorCOM/Dancall practices were changed to more MNC oriented practices.

The rationale for the choices was thus, to summarize, that both TIDK and Motorola seemed to be companies which were part of the local NorCOM world. TIDK was a successful semiconductor subsidiary, active in the NorCOM association, with work that apparently was similar to other MNC semiconductor subsidiaries in the NorCOM cluster. Motorola was special due to its history, but exactly because of this history it also seemed plausible that this organization was, or at least, had been, part of the local NorCOM world.

It is necessary here to discuss a bit more, why I use the term 'apparently' above – why did I not investigate precisely what the different companies in the cluster was working with? This has to do with the nature of the wireless telecommunication industry where the work is surrounded by

high levels of secrecy and protected by non-disclosure agreements etc. Because of these it was not possible to gather precise information about what technologies and products the different companies in the NorCOM cluster was working with or what their turnover was, or even precise numbers regarding the staff. The only thing I could use as the basis for my choice of company was therefore the information which was announced in news articles and on homepages as well as information from key persons in the cluster who knew the companies and their areas of work, although it was often restricted how much precise information they could disclose. How little information that was public available about the companies became clear as I started work on the two case companies, let me therefore explain how this went along.

Given the secrecy and the use of non-disclosure agreements in the telecom industry, I could not do a study of learning processes in TIDK without a contract with the company, not even the technologies the company worked with could be disclosed without a contract. The first step of the study was therefore to create a non-disclosure agreement with TI. The first months of 2007 was therefore spent on contractual work where drafts were sent back and forth between AAU and TI, and finally in March the issue was settled, and a non-disclosure agreement was signed. To construct an understanding of the organization TIDK and how learning occurred in this organization, I conducted interviews of top-managers, middle managers, and project managers, and I made observations in the company. I soon realized that if I were to make sense of what I saw, then I needed a minimum of understanding of the work that was being done. Being a geographer by education, I had little idea of how a mobile phone worked, I knew it involved an antenna and some chips and some software, and that was pretty much it. Luckily some of the managers in TIDK were helpful, and literally spent hours explaining to me how a phone worked on a very general level. What is the protocol stack? What is the baseband? The RF front end? The antenna?, What is a reference design?, What is a form factor design? How is the production in TI organized? And how did the work areas of TIDK relate to other TI sites? I also discussed the technical issues with a professor in telecommunications at AAU to reach an understanding of the work area. And this very basic knowledge became very useful, because it meant that some of the discussions in TIDK started making sense to me, and I could form an understanding of what the issues discussed in the organization were about. Further, and also important, I found, that both engineers and managers were more open towards participating in interviews, or just talking to me about their work, when they found out that I had some kind of idea about what they were doing. I also participated in two internal knowledge sharing conferences in TIDK, and although this was primarily to observe the dynamics related to knowledge sharing, it also gave me a better understanding of the technology. As I thus gained a basic understanding of the organization and the work done, I started focusing on the practices within the organization. What were the management practices and the engineering practices? TIDK was a R&D subsidiary, so these were basically the two only practices. Of course, engineering practice in TIDK can be categorized more elaborately into different categories; hardware engineers and their practice, software engineers and their practice, tools engineers and their practice, audio engineers and their practice etc. But before going into how I approached the study in more detail, it is necessary to return to the question of secrecy in the industry, which I mentioned before.

As mentioned, TIDK was chosen, because it was a case of a local company which was similar to other semiconductor MNC subsidiaries in the cluster, according to what I had heard from different cluster researchers and people in the industry. But this, and this is the point, was only what I had heard. What surprised me the most, after I had signed the NDA, and stated to process of col-

lecting data about TIDK, was how little I, and the other researcher who worked with the NorCOM cluster, actually knew about what this company was doing. The discussions about the NorCOM cluster in academia and news papers had, as I shall also return to later in the analysis in chapter 8, mainly been on the jump from 2G technology to 3G technology. Could the companies make this jump, and the discussions among researchers had been about which companies that was working with what. What I saw was a much more complex world. The discussions on 2G vs. 3G were relevant, but they were not the whole story. The actual challenges faced by the engineers and managers were on much more detailed levels, and related to the different parts of a phone, and the different technologies within a phone. A phone was not just one piece of technology which could be labelled as 2G or 3G, where 3G was more technologically challenging than 2G. The R&D companies competed on all the different parts and technologies within these very complex phones. It was not just an issue of making the newest 3G technology for example. Another issue was to make highly integrated chips for 2G phones and thus cheap 2G phones. In the radio sphere it was for example software defined radio which was one of the competition parameters. And this list could be expanded to several pages of technological issues relating to the phones, on the basis of which the wireless industry competed.

My point is, that what I realised was that the distinction between 2G and 3G was far too simple to understand the dynamics within the company, let alone, the telecommunication industry and this cluster. This leads to the question of why the cluster researchers, of which I was one, thus had been and were discussing the technological development in the industry, and the fate of the NorCOM cluster, using the 2G vs. 3G technological jump frame, which is for example the basis for (Dalum, Pedersen, & Villumsen 2005). And the answer was simple: This was the only data available without contracts with the companies. The R&D companies in the cluster could disclose vaguely whether they were doing work on phones which would be 2G or 3G phones, but not information about which technologies or what products they were working on, because such information could be used by competitors. If one company disclosed which wireless technologies they were working with, then competitors could use this as a basis for guessing the feature of future phones from this company, and take actions accordingly. Furthermore, from a technological R&D company standpoint, work on a 2G phone could in many aspects be as challenging as 3G phones; the technological competition parameters were just different. And this finding, that very little information was actually publically available, is also crucial for the question of what type of case TIDK is.

The contract with TI meant that I could see that I, as well as other cluster researchers, knew very little about the other companies in the cluster. I cannot therefore say with confidence, whether the work areas of TIDK was indeed similar to other companies in the cluster, or whether TIDK was similar in relation to work practices and learning dynamics. From what I heard through my studies from people within the cluster as well as people in TIDK and Motorola, it seems plausible that TIDK was indeed an example of a "NorCOM" company and embodied what most of the companies in the cluster were. But since it was impossible to obtain contracts with all companies to gather such information given the resources available for this thesis, I cannot say that this is the case for TIDK with more confidence than this. And this is also why I will not present a list of companies and their work areas in the NorCOM cluster, because such a list will be superficial. I will therefore instead settle on TIDK and Motorola.

In the Motorola case it also took a couple of months of legal work before I could access the company, and start studying it in 2007. Also in this case I conducted a number of interviews of managers and engineers to form an understanding of the organization. Having now presented the rationale for the choice of TIDK and Motorola, it is time to turn to how I approached these studies analytically.

Due to the legal contract I made with Motorola, and the sudden closure of Motorola, which I will elaborate on later, I do not have permission to publish any material from the study of Motorola. Therefore I am unable to use any of the empiric data collected in the Motorola case in this thesis, and therefore I will only discuss the TIDK case in the following sections.

5.1.3 The case study of TIDK commences

To analyse how the localness of the NorCOM cluster and the globalness of TIDK came together in learning processes within TIDK, I decided to go into detail with a few communities of practice, using (Wenger 2004) to theoretically conceptualize learning processes. There were a number of communities of practice in TIDK formed around different work tasks, and given that it was an organization with more than 200 employees I could not investigate all these practices. This raised the issue of how to choose. I was still working on understanding the structure of the organization, and how different groups and work areas within the organization fit together. Therefore I decided to follow the work on one project within TIDK. Wenger's communities of practice are, as discussed earlier, communities which are joined through a mutual engagement around a joint enterprise. I therefore chose one project within TIDK and tried to uncover the communities involved in the work on this project, and then study some of these in detail.

The raised the issue of how to choose a project. As the objective was to study the factors influencing learning within the COPs the project had to be a project which involved knowledge and learning. Of course, one can argue, that all work conducted within an R&D organization to some extent demands learning and knowledge. But still, some tasks may require the development of solutions to new and complex problems, while other tasks may only involve the reuse and adaptation of solutions developed for earlier tasks. To make sure, that the project which I chose was one which involved the development of solutions to new and complex problems and hence demanded learning, I consulted the managers within TI and discussed the issue with them.

We arrived at the conclusion, that the best approach would be to study communities of practice related to the eCosto project. Let me elaborate on this. There were at that time, around 2006 and 2007 a range of different classes of mobile phones in the mobile market. There were the high-end phones, the smart phones, the mid-end phones and the low-cost phones, and even the ultra low-cost phones. One could think that the technological challenging work was only present in the high-end segment using the new 3G UMTS technology, but this was not the case. While there were indeed technological challenges in the high-end segment, to make the phones more powerful and include more functionality, there were also challenges in the low-cost segment, and these were to make the phones cheaper and include more functionality, and there were also a market segment for this type of phones. TI sums this neatly in the following quote, which is from an announcement made on TI's website in 2007:

"Mobile phones are becoming an effective tool to "connect the unconnected" with information, resources and, simply, each other.

Wireless technology provides widespread voice and Internet connectivity to millions who have never had these capabilities. This segment, known as the low-cost or even the ultra low-cost market, represents a significant global opportunity. But it is not the only opportunity.

As handset costs decrease and multimedia gains broader appeal, a wireless growth vector emerges with a new breed of low-cost devices that will include rich multimedia performance. To address this growing segment, we must support integration of rapidly advancing multimedia" (www.ti.com 2011)

The objective of the eCosto project in TI was to make a so-called single-chip solution, where the radio was integrated in the same chip as the application processor making the solution significantly cheaper:

"TI addresses this need through continued achievements in its single-chip technology. TI's recently announced single-chip OMAP-Vox™ EDGE product, the OMAPV1035 processor, leverages TI's innovative DRP™ integrated digital Radio Frequency (RF) technology.

Codenamed "eCosto," the solution combines a cellular modem and applications processor in one chip to bring video capture, playback and streaming, multimegapixel digital cameras, color Liquid Crystal Displays (LCDs) and interactive 2D/3D gaming to affordable phones for the mass market.

As an industry, we must continue to push the functionality envelope, offer more personalization opportunities and provide a richer user experience. TI was the first company to introduce a single-chip solution for GSM/GRPS mobile phones with its industry groundbreaking "LoCosto" solution."

We're now taking this pioneering solution a step further with "eCosto" to make multimedia-rich phones affordable for the masses. Great opportunities are ahead for wireless, and together as an industry, we can bring multimedia applications to the global market." (www.ti.com 2011)

GSM knowledge has, as I shall elaborate on later, been the core competence in the NorCOM cluster from the late 1980s and to the end of the 2000s. Therefore in 2006-2007, I decided to chose the eCosto project as my main focus, because, this project demanded GSM knowledge since the objective was to integrate the GSM radio into the application processor, and as such the project would draw on the core competence in the NorCOM cluster; GSM knowledge. As history turned out, the eCosto project was terminated by TI in 2009, but at that time, the chip had reached a state, where it was described by one manager in TI as possibly being the most highly integrated GSM RF front-end ever devised.

I therefore started studying the eCosto project, trying to identify the groups involved in the work on the eCosto project in TIDK. And as I focused on these groups, trying to understand their practices, and how these practices were influenced by the local cluster, by dynamics within TIDK as well as the relationships to other sites within TI as well as by customers and suppliers, it slowly dawned on me, as I went back and forth between my empiric findings and the theory on communities of practices, that my conceptual framework, i.e. the theory on communities of practices, meant that I was missing something important: the issue of how the subjects in TIDK was shaped into specifically the subjects they were in relation to their work, subjects, which were different from the subjects in other places in TI. And therefore, throughout the summer of 2007 I realized that I needed to use a different approach to the study, capable of analyzing this. And

therefore I turned my focus to Foucault. I have in chapter 3 dealt with the differences between Wenger and Foucault, and will not go into this again.

The autumn and winter of 2007 and spring of 2008 were spent reading Foucault's work, writing a paper on power and clusters (Reinau & Dalum 2008), and rethinking the case study. Using the ideas on genealogy the late summer of 2008 was then spent collecting data on the changes in TIDK over time, i.e. the events which had characterized the TIDK organization.

In the late fall of 2008, news came from TI, which came as a shock to me: TIDK was put up for sale by TI! Suddenly the company, which I was building my Ph.D. on, was being sold, and I was in the middle of my data collection. The other company I was studying Motorola, ended up in the same situation a few weeks later, so now suddenly both my case companies were put up for sale.

This put me in a difficult decision, because due to the legal contracts I had entered into with the two companies, the companies had to clear any texts in which I used data collected in the studies before publication was possible. This meant that if the companies were sold or closed before I could get my texts cleared officially, I would be unable to publish anything from my studies. At this time I had spent almost two years studying TIDK and more than a year on the Motorola case. At that time in the fall of 2008 when these announcements came, my analysis was far from finished. I was just in the process of changing to a Foucauldian approach analytically, and had planned to collect data in both companies in 2009 and 2010.

My only option was to collect as much data as possible before a sale or closure, analyze this, and get the analysis cleared for publications before the companies were sold or closed. I therefore focused my efforts on TIDK, since this was the case study I was furthest along with, which also means that when Motorola was unable to find a buyer for the Aalborg site, and therefore closed it the 14th of January 2009, I lost the rights to publish anything from my study at Motorola, and hence also the chance to use that case in this thesis. So a significant amount of work was lost for me that day.

It was a race against time to finish the analysis of TIDK, because nobody knew when a sale announcement would be made by headquarter, or whether it would be sold at all or closed instead. I therefore wrote the data I had already collected into one story, "The story of TIDK", and conducted a number of interviews more to elaborate upon this, and then I had that story cleared for publication. Then a window of opportunity came, because it was also announced that a number of internal activities would be closed down by TI, and this meant that a lot of managers and engineers had limited work to do. And therefore, while TIDK was still running, I conducted a number of interviews in TI Nice and TI Dallas, and wrote these together in the story "TIDK seen from the outside". This document described TIDK as it was seen from other sites within TI. Since TI Nice played a key role in the story about TIDK, I predominantly focused on how TIDK was seen from TI Nice. Furthermore, I added the view from TI Dallas since TI Nice, TI Dallas and TIDK formed the main sites within the RF field, the field forming part of the core competence in TIDK. This story builds on a number of interviews of key persons, both managers and engineers in TI Nice and TI Dallas. This was also cleared for publication. It turned out, that TI was not able to find any buyers for TIDK, and therefore TIDK was closed down in April 2009. The third and final document I got cleared was a document containing the transcription of an interview which took place on the 25th of Marts 2009 in TIDK. One respondent was the managing director of Texas Instruments Denmark. The other was the site manager and R&D director of TIDK's site in Aalborg. The interviewer was me. The objective of the meeting/interview was two things. The first objective was that the managing director should sign a document regarding the publication of the story "TIDK from the Outside". The second objective was for me to hear the managing direc-

tors and the R&D director's comments on the results I had from my case study of TIDK. This makes the timing of the meeting interesting, because the 25th of Marts 2009 was 6 days before the official closure of TIDK. Therefore the discussions in the meeting gives an interesting view of how these two top-managers looked back on the story of TIDK and their reflections on this story, just before they left their offices and TIDK closed.

Given the legal status of these documents, I am not able to change anything in them, and therefore they are presented in their original form in this project. Chapter 6 and 7 present the two stories.

It was of course a weakness, that I did not have a fully developed Foucauldian analytical framework for the study while I collected the data throughout 2008 and 2009. Nevertheless, the most important point to make is, that although it was not fully developed, it was developed enough to make sure that I captured important events, and the discourses and practices, which shaped people in TIDK as subjects in relation to their work. I will elaborate on the analytical approach in section 5.2. It became clear from the additional analysis of these stories, which I worked on through 2009 and the beginning of 2010, that a second step in the analysis was needed: It was also necessary to analyse how the NorCOM cluster had been constructed as an entity, before it was possible to describe precisely the problematization which were shaping people in TIDK as subjects in relation to their work. As the discussion in the analysis in chapter 6 to 9 will show, the analysis of TIDK showed that the subjects in TIDK were clearly different subjects in relation to their work compared to subjects in other sites of TI. But to investigate whether this was due to discourses and practices which were special to TIDK, and only existed within TIDK, or whether it was due to discourses and practices which were widespread within the NorCOM cluster, it was necessary to investigate how the NorCOM cluster had been constructed through specific discourses and practices. This step became of extreme importance, because, if the analysis showed that the discourses and practices, which shaped the subjects within TIDK had a relationship to practices and discourses within the NorCOM cluster. Then the problems which the differences between the subjects in TIDK and the subjects at other TI sites gave rise to, over time, and which to a certain extent was the reason why TIDK lost its *raison d'être* within TI, was actually the manifestation of the clash between how discourses and practices within a local cluster could shape subjects in such a cluster in a way which made it difficult for these subjects to function as parts of a MNC organization. The following analysis will elaborate on this. The point is, and this is part of the contribution of this thesis, that the analysis of TIDK and of the NorCOM cluster shows how certain practices and discourses can be created within clusters, which can have consequences for how workers in such clusters are shaped as subjects in relation to their work, and thus on their behaviour in relation to this work. And therefore the investigation of the NorCOM cluster was a necessary part of the analysis. Let me therefore turn to the analytical framework now, and how I approached the study of TIDK and the NorCOM cluster.

5.2 Analytical approach to the study of the people within TIDK

When looking at TIDK, and being about to start the study of how this company and the people within it became what it and they were over time, it is necessary to start by recalling, that there are, as Foucault argued, no "immobile forms that precede the external world of accident and succession" (Foucault 1984a, p.79). The company, TIDK, with its workers, is a social construction, and so is the cluster which it is part of; the NorCOM cluster.

To analyse why the organization TIDK and its employees had become what they were over time, it is therefore necessary, as Foucault described in his work on genealogy, to explore all the struggles and accidents in history that lead to the emergence of TIDK, with its specific employees, as it and they were, with the specific characteristics it and they possessed.

It is, at the beginning, necessary to dismiss all ideas about what dynamics or processes which are important in relation to the construction of the company and its people, whether it is learning, knowledge spill-overs, externalities due to a pool of workers in the cluster etc. The only way to proceed is to analyse the descent and emergence of the events shaping the organization and its people over time.

This also means that I should not set as the goal of the analysis to uncover what the basic characteristics of TIDK and its employees were. This seems a trivial point to make, but it is important, because when the objective is to study one local organization; ATL Research which was acquired by an MNC, TI and thus became TIDK, and the organization's employees, then one can easily fall into the trap of searching for the things characterizing the "true" or "pure" local company ATL Research, the "true" or "pure" MNC subsidiary TIDK and the "true" or "pure" or "average" TIDK employee. The point is that there is no such true or pure form; there is no essence of what a local company or what an MNC subsidiary are, there are no clear characteristics of what a local company is compared to an MNC subsidiary, or what a subject employed within this company is, which can be uncovered in the analysis.

Instead of trying to uncover the dynamics characterising the "TIDK subsidiary worker" in the NorCOM cluster, the analysis will instead, as Foucault explained in relation to the genealogy, investigate the emergence and descent of all the events, understood as changes in power-knowledge relations, leading to the emergence of the organization TIDK with its specific employees, who were specific subjects in relation to their work.

This also means, that I should not try to judge whether TIDK as a whole was a success story or a failure, because, this would entail me trying to place a tag on the organization, which would in turn imply that there are some unity, that there were indeed something joining all the events together, which gave rise to TIDK as it were, and its employees, a development or an evolution. Foucault dismissed the notions of development and evolution exactly because they implied the idea, that something was unified. But things are not, the only thing I can do at the start of the analysis is to accept, that there were a number of events occurring from the late 1980s and onward to the late 2000s, through which TIDK, as the organization we can read about in newspaper articles, research articles etc. emerged, and that this organization as well as its employees were different at different points in time.

It is however necessary to define a point in time, which will be the present in the analysis. Foucault took as his point of departure the "present prison", as it were at the time he wrote his book on discipline and punish. Since TIDK was put up for sale by TI in October of 2008, and closed in 2009, and a lot of changes therefore occurred within the company in these months related to the closure, I will chose September 2008 as the point in time from which I will start my analysis, September 2008 is thus "the present" in my story. The rationale for this is, as explained earlier, that when the decision was made that TIDK was to be sold or closed, I had already collected a significant amount of data to analyse what TIDK was. With the decision to sell TIDK, which was a significant event in the story of TIDK, the reality within TIDK changed, and a new situation emerged again, but I did not have time to write the history of that new "present situation".

The question is thus, how do I write the history of that present TIDK and its employees, i.e. what subjects they were in relation to their work? This is where my reversed reading of genealogy and archaeology comes into the picture.

As discussed earlier, (Flyvbjerg 2001) argues that practices are more important than discourses. And this leads to an analytical focus on the series of events, and the emergence and descent of

such, and thus in analytical works often upon who does what to who and when. In short, (Flyvbjerg 2001) places the analytical focus on genealogy. We should recall here, that the core of genealogy is not a search for the deep explanation of an event or the uncovering of an a “pure” origin, but a quest to illuminate the surface of events, and situate these events on a map among other events, to thereby be able to uncover the descent of the different events, how they relate to each other, what their descent were in the successions of struggle and accidents characterising history, and thus what changes in the fields of power-knowledge relation that caused their emergence.

I will argue, that this is a well chosen starting point, but can only be the first step, because, after the line of events have been uncovered, and the relationship between them investigated, and the map of events and their relationships to one another thus uncovered, refer to the discussion in section 3.2, it is necessary to include the discourses in the analysis, because this gives a more detailed picture of the dynamics in focus. In the case of TIDK, the inclusion of both the discourses and practices, makes it possible analytically to uncover how the location in the NorCOM cluster of TIDK influenced the organization and its people, because, the discourses constructed in relation to the cluster was partly what shaped the behaviour of the people in TIDK and some of the events in TIDK. To explain this, let me begin by the notion of change.

The point in genealogy is to uncover the line of events shaping the construction of the research object in focus. In the case of the working subjects in TIDK, this means an analysis of the events which shaped TIDK as an organization and the subjects which worked within this organization. Events are, as discussed in section 3.2 changes in force relations, i.e. changes in power-knowledge relations, and thus also changes in discourses, recall that an event is also described by Foucault as, quote “the appropriation of a vocabulary turned against those who had once used it” (Foucault 1984a, p.88), as well as the relationship between knowledge and power, which means that one cannot exist without the other.

The only way to begin the analysis of TIDK is therefore, as a first step, to identifying the changes over time which influenced the organization TIDK as well as the work practices of employees in TIDK, in a way so that power-knowledge relations and discourses were changed, i.e. the events shaping TIDK and its employees over time. It is important to emphasize here, that this description of changes will only include events, i.e. changes which changed power-knowledge relations and discourses. If the empirical investigation for example shows that a change occurred in relation to the organizational structure in TIDK, but also that it did not have any impact upon power-knowledge relations or discourses; then this change is not an event, and is therefore left out of the analysis.

When these events have been identified and described, the next step is to identify the relationship between them, what were the emergence and the descent of these; this does not only include their relationships with other events. It must also, given the nature of events, include an analytical focus on the discourses which made these events possible. This is where I return to the archaeology and draws on this to a higher degree than (Flyvbjerg 2001) does. One concept I will draw out from section 3.3 in this regard is the notion of discursive formations, which Foucault as mentioned, described in the following manner:

“Whenever one can describe, between a number of statements, such a system of dispersion, whenever, between objects, types of statement, concepts, or thematic choices, one can define a regularity (an order, correlations, positions and functionings, transformations), we will say, for sake of convenience, that we are dealing with a *discursive formation*” (Foucault 1972, p.41-42)

To understand how the persons were constructed as subjects in relation to their work within TIDK, it is necessary to investigate both the events shaping the organization of TIDK, as well as the work of the people in TIDK, as well as what discursive formations that were surrounding the changes in the organization as well as in the work.

When these are uncovered, then it becomes possible to start to piece together what different discursive formations that influenced the people in TIDK in relation to their work and the organization were part of, and thus also create a more elaborate picture of the forces which shaped TIDK and its people than a focus on the events alone would make possible. Foucault argued in relation to the relations which constitute the objects within a discursive formation:

“... They do not define its internal constitution, but what enables it to appear, to juxtapose itself with other objects, to situate itself in relation to them, to define its difference, its irreducibility, and even perhaps its heterogeneity, in short, to be placed in a field of exteriority” (Foucault 1972, p.50)

The analysis thus have to begin to uncover what discursive formations, what relationships, that made it possible for the employees within TIDK to understand themselves as working subjects in relation to the organization TI. This is basically also what Foucault’s notion of problematization is about, as he argued that a problematization can be understood as:

“... the ensemble of discursive and non-discursive practices, that make something enter into the play of true and false and constitute it as an object of thought (whether in the form of moral reflection, scientific knowledge, political analysis, etc.)” (Rabinow & Rose 2003, p.xviii, Foucaults own words cited)

The focus is in other words the ensemble of discursive formations, remember that practice is part of discourses, which made it possible for workers within TIDK to be understood as such, and with a job, which could be done right or wrong, or at least, just have a job, in relation to which it was discussed how they ought to behave as workers, and in relation which they behaved in specific ways in relation to the events which shaped TIDK.

The first step of the analysis is, as argued earlier, to identify the events that changed the organization TIDK and the work of the people in TIDK. Therefore I will start chapter 5 with section 1⁵, which will describe the company which TI acquired, ATL Research, and section 2 which will give a short introduction to the story of TIDK. Section 3 and section 4 in chapter 5 will thereafter describe the changes in relation to technology and the market which influenced TIDK and the work within TIDK over time. Section 5 will thereafter focus on changes in the management practices within TIDK, i.e. the work of the managers in the R&D organization, as well as the organizational structure of TIDK. Section 6 will thereafter focus on the engineers and their work practices. Section 5 and section 6 will show that through the changes which occurred in the TIDK organization, in relation to the organization, the work tasks and the work practices and competences of the engineers and managers, political games within the TI organization played a central role. They were an important part of the work for the managers, and influenced the work of the engineers.

To understand the role of the political games in relation to the analysis, we can return to the relationship between power and knowledge which is, as discussed earlier, that there can be,

⁵ Due to the contract with TIDK who approved the content of “The story of Texas Instruments Denmark”, chapter 5, as well as “TIDK from the outside”, chapter 6, for publication, I am not able to change the numbering of the sections in these story. Therefore they do not follow the same numbering as the rest of the thesis.

quote: “no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations.” (Foucault 1991, p.27). This means that events will always imply, by their very definition, a change in both power relations and knowledge, and these discourses, refer to the discussion about discourses in the previous sections. This means, that an event always entails the change of both power relations and discourses. And Foucault used the notion of strategies to be able to group discourses, and hence they can also be used as a tool for grouping events. Not grouping in the genealogical sense of descent and emergence, but grouping in relation to the strategies involved in the power-knowledge relations. And it seems that this was exactly the strategy he used to be able to chose his analytical focuses in his genealogical works, and why he argued “... decipher power mechanisms on the basis of a strategy that is immanent in force relationships” (Foucault 1998, p.97)”. It seems plausible that what he did was to analyse all the changes between the two types of punishment he observed in “Discipline and Punish” to use this as an example; the torture and the timetable. And on the basis of an analysis of the strategies involved in the power-knowledge relations surrounding all these changes, he identified a strategy which was the disappearance of torture as a public spectacle as the main strategy. And, since this strategy was victorious, and tortures did cease to be a public spectacle, this strategy also came to be an event, which changed the penal system. The political games, in the story of TIDK, are the equivalent of the disappearance of torture as a public spectacle in “Discipline and Punish”.

Through the changes which occurred in the organization, these political games had an important place as what the work was about, they were a strategy. Not only did they influence the work, they also influence the engineers and the managers as subjects in relation to what kind of working subjects they saw themselves as. This is the point of the analysis where discourses enter the picture. Until this part of the analysis focus has been on practices and the changes characterizing the TIDK organization and the work done within this organization. Now with these changes described, i.e. the events which shaped the structure of the organization as well as the work within it, focus is turned towards the discourses which characterised and influenced the work within the organization. And this was primarily the discourses surrounding the political games, i.e. the struggle to gain and maintain a *raison d'être* within the TI organization. It was a struggle to attain work and new competences in the competition with other TI sites. And the interviews conducted shed light on the discourses which shaped these political games. The main focus of these discourses was according to the interviews a notion of a special culture in TIDK. People in TIDK stated that they were different from other TI employees, and behaved different in their work, including in relation to political games. The notion of a special culture amongst the employees thus becomes central, because the question emerges, what is this culture, and how has it emerged, the very idea of a special culture characterizing an “us”, and does it have roots in the localization in the cluster?

Therefore section 7 focuses on the political games within TI, and the nature of these, and section 8 explores through the use of interviews what this so-called special culture is, or in other word, what it is, according to the discourses within TIDK, that makes TIDK employees different compared to other TI employees. This focus on the special culture, on capturing what people in TI articulates as the difference with the TIDK employees, is also the focus in chapter 7 which explores the same issue as seen from other TI sites, and thereby elaborates on the interpretation of the discourses and practices. First section 1 in chapter 7 adds to the interpretation of how the acquisition occurred and the end of the story by adding the view from TI Nice and TI Dallas. Section 2 then focuses on the changes in TIDK as they were seen from the outside. Section 3 elaborates on the characteristics of TIDK by illuminating how TIDK was seen from TI Nice and TI Dallas and section 4 explores the impact of the NorCOM cluster as seen from outside TIDK. Finally section 5 summarizes the chapter.

Thus chapter 6 and 7 first draw a picture of the events which shaped TIDK over time, and then turn the focus to the archaeological inspired focus on the discourses surrounding these changes. And this will show that the main discourses in this regard related to the political games within TI and the struggle for a *raison d'être*. What affected the behavior of the employees in relation to this game was, according to both themselves and people from other sites within TI, that people from TIDK have a special culture. The chapters also reveal what characterizes this culture. The important question to draw on the basis of this is that since we here see an organization; TI, which influences TIDK in a specific way, but that TIDK employees still behaves different, have another "culture" than the rest of TI and sees themselves as an "us" in relation to a "them" within the organization, then how did that special culture emerge? This special "us"? Or in other words, this special types of working subjects within TIDK? Did the discourses about and around this special culture come from ATL Research, or was it something which originated in the NorCOM cluster. The next step of the analysis is therefore an analysis of the NorCOM cluster to investigate whether this is the case.

5.3 Analytical approach to the study of the NorCOM cluster

The objective of the second step in the case study was therefore to investigate how the NorCOM cluster became what it was, and in this also investigate whether this gave rise to a understanding of an "us" among the people in the cluster, and if so, how this emerged and what the descent of this was, and furthermore, what characterised this "us".

In framing this analysis I will again start by drawing on the genealogical approach, and investigate the events which characterized the NorCOM cluster over time: how did the discourses which it was articulated in as a cluster emerge, when was the NorCOM club founded, when was the association founded, and along which dimensions did the association change along the way?

This initial analysis showed, that to understand how the NorCOM cluster emerged as an entity in discourses and practices; how it entered the game of true and false; how it became an object which could be discussed among people within and outside Northern Jutland, it is necessary to turn the focus to the discourses surrounding the cluster.

Just as Foucault used this archaeology to investigate how certain concepts, such as madness, emerged in society, so will I draw on this method, to investigate the emergence of discourses dealing with the NorCOM cluster. In other words, how the very notion of a "NorCOM cluster" was constructed through different discourses and practices. (Foucault 1972) was as discussed earlier a book which dealt with how to conceptualize and analyse how discourses emerge, and how they have important implications for society, and then they disappear again. This is what I will do in the second step of the case study; how did the discourse about the NorCOM cluster emerge, and how did it shape society, or at least the small part of society which was a part of the NorCOM cluster, over time?

To analyse how the NorCOM cluster became what it was it is necessary, not to start with the NorCOM cluster association which was established as an organization in 1997 and trace the changes in this organization in a way similar to what was done in the TIDK case. Instead it is necessary to start with the very idea of a telecommunication cluster in Northern Jutland. How did the discourse that there was a telecommunication cluster in Northern Jutland emerge, and what was the descent of this discourse? How and where was it articulated? How did it gain momentum? What was the relationship between this and other discourses? And thus analyse how did this telecommunication cluster became the "NorCOM cluster"? What were the discourses surrounding this "NorCOM cluster" that made this cluster what it was over time, and how did these emerge, and what were their descent? And further, how did they change over time. This is

what will be analyzed in step 2 of the case study, and therefore I will draw more on the archaeological method in this analysis.

I will start the analysis with a short account of the conventional story of the NorCOM cluster. Just as Foucault does when he present the “repressive hypothesis” in (Foucault 1998). And just as he then criticises the “repressive hypothesis” so will I criticise the conventional account of the NorCOM cluster, and I will do so through an analysis of the discourses which created the cluster. The problem with the conventional story about the NorCOM cluster is that it is silent about the discourses and practices which characterized the cluster at certain times, it is just a simple genealogy of which organizations that emerged when and subsequently, gave rise to other organizations. My archaeological analysis will therefore place the emphasis on the discursive side of the story of the cluster.

The analysis in chapter 8 will show in detail that the NorCOM cluster was not simply a collection of companies, which according to some scientific definitions could be, and was, classified as a cluster and then given a name. It was something more complex, it was a collection of companies, but it was also something which was constructed discursively through the articulation of a number of different discourses, emerging in different settings, which came together and through the relationships between these, the NorCOM cluster emerged. These discourses emerged in the industry, at the local university, in scientific circles, at the local science park, in newspaper articles etc. And together these discourses not only constructed the notion of a NorCOM cluster, they also constructed what the cluster was, and gave a unity to the members of the NorCOM cluster, they got an “us” through the discourses, and further, the discourses also defined what this “us” could say and do, and could not say and do.

What defined the NorCOM cluster is a number of things, which are related; the workers, the university, the science park, the cluster association, the success story about DC Development, the successes of Dancall and Cetelco, the downfall of Flextronics, the struggle with IT Forum and parts of the university. These relations together form a net through which a discursive formation emerges, which we may call the NorCOM cluster. The NorCOM cluster exists through these relations, or one may say, they are the NorCOM cluster. But as the case study will show, the cluster was in no way a constant. These relations between different discourses and practices changed constantly, and the boundaries also changed, i.e. the discursive formations which surrounded the formation dealing with the NorCOM cluster. Whereas the boundary in the early 90s were other discursive formations dealing with say technological districts, or the NMT market, and later the GSM market, the formations became different later, for example in the form of the discursive formation dealing with regional development in Denmark and support for new high-tech industries.

The point is this; that the NorCOM cluster discourse does not exist only as a discourse formation existing through the relations between a number of things that constitute the cluster, it is also located in a wider context between other discursive formations, and the change of the NorCOM cluster arise both from the changes of relations “within” as well as the changing landscape of discursive formations surrounding it, as chapter 8 will show. And therefore my story of the NorCOM cluster will differ from the conventional accounts.

Section 8.2 will therefore look at the rationalities behind the move into the telecommunication industry in the region. Section 8.3 will focus on the discourses and practices in the telecommunication industry around 1990, and the dynamics around NOVI and DC Development. Section 8.4 will investigate the emergence of the cluster as a concept in the mid-1990s. Section 8.5 will explore how the cluster was constructed as a success story of fairytale proportions in discourses in the late 1990s. Section 8.6 will analyze the discourses and practices which came to characterize

the NorCOM cluster internally from the emergence in the mid-1990s and until the merger with IT Forum, which was a special discourse around business, and to uncover this, the section also examines in detail the legacies of DC Development and Dancall. Section 8.7 thereafter focuses on the discourses and practices surrounding the NorCOM association in the 2000s, which was characterized by a struggle between the NorCOM association and a number of other organizations in the region. Finally, section 8.8 focuses on the end of the NorCOM cluster. The analysis will reveal that some of the issues which were seen in the TIDK case were apparently also issues in relation to other subsidiaries in the cluster. Therefore section 8.9 rounds off the discussion in this case by investigating the discourses and practices around the company Digianswer, which was also acquired by an MNC to illuminate in more detail whether this company also experienced issues similar to the ones we saw in the TIDK case.

The analysis of TIDK and the analysis of the NorCOM cluster are both necessary to answer the research question posed in the beginning of this chapter. The point is that each analysis captured parts of the discourses and practices which are important to answer the research question. Chapter 6 and 7 identified the discourses and practices which were decisive for the way in which the people in TIDK was constructed and chapter 8 identified the discourses and practices through which the NorCOM cluster emerged as a cluster. With all these discourses and practices identified, the final step is to conduct an archaeological analysis of the discourses and practices identified in these chapters to thereby make a better interpretation of the discursive formations making the people in TIDK the subjects they were, as workers in an organization within the NorCOM cluster. Chapter 9 does therefore not constitute a simple discussion of the results from the previous chapters; it is instead an archaeological analysis where the findings from the previous chapters are analyzed to identify a number of discursive formations. When these are found, I will discuss some of the problematizations which were most important in the course of events constituting the people in TIDK as workers in the NorCOM cluster, and also discuss what implications these findings have for the conventional cluster literature. Since this archaeological analysis in chapter 9 builds on the results from chapter 7, 8 and 9, I will not discuss the analytical approach to it here, but instead present this in the beginning of chapter 9, because then the basis for the analysis and the discussion in chapter 9 is clear to the reader, and the approach easier to explain.

Having now presented the analytical framework for the two steps of the case study, it is time to turn focus to the collection of empiric data for the two cases.

5.4 The collection and analysis of empirical data

The goal of the analysis in the following chapters is to uncover the discourses and practices through which the people in TIDK were constructed as subjects and the NorCOM cluster was constructed as a cluster. This brings me to the question of how to do this through empirical data – what data should be used, how can it be collected and how should it be analyzed, given the Foucauldian analytical approach and the phronetic approach to science underpinning this thesis? These are the questions this section will deal with.

5.4.1 Challenges in uncovering discourse and practice through empirical data

How is it empirically possible to uncover discourses and practices which occurred 5, 10 or even 20 years ago? Foucault himself used books, articles and other written material which he used to identify what statements were articulated at given points in time, the discourses surrounding specific issues and the practices occurring in different settings. In some of the literature using a Foucauldian approach, such as (Flyvbjerg 1998b), the analytical focus has also been placed on written sources, for example minutes from meetings, reports, etc. The focus on written docu-

ments follows from the fact that these illustrates what was said or done at a specific point in time. Over time people might remember the discourses and practices. However, they might also reinterpret the discourses and practices in the light of other events which have occurred since, or simply forget the discourses or practices. Therefore written documents have the advantage that the discourses and practices which have been captured in documents at certain points in time and space have been frozen in time and space so to say. When the researcher sees them, they have not been reinterpreted, in other words, they offer a window into the past, and thus an opportunity for the researcher to gain insight into the discourses and practices occurring at specific points in space in time.

Written documents, however, also hold certain weaknesses. Firstly, it is a matter of whether written documents exist which captures the discourses and practices which the researcher is interested in uncovering. Secondly, even if documents exist, it is a question whether they capture all the discourses and practices or only certain discourses and practices. In other words, do they only capture a part of the full picture? Let me elaborate on this.

There are some things that are not written down anywhere. There are decisions which are taken in organizations by the coffee machine, in the corridors or over lunch which leave no paper trail. Drawing a link to the cluster literature, we could note here, that one of the reasons why Paul Krugman criticized the study of knowledge spillovers in his seminal contribution (Krugman 1991) was that they leave no paper trail which can be analyzed.

We should not be blind to the fact that written documents may not always reflect directly all of the discourses and practices surrounding them. (Buchanan & Badham 2008) explored the issue of politics in an organizational setting, and one of the more brutal perspectives on organizational politics they presents is Von Zugbach's 13 points characterizing the winning manager, of which two points are:

"7. Say one thing and do another. You need to pay lip-service to the organization's cherished notions of how things should be done." (Buchanan & Badham 2008, p.29)

"10. Manipulate the facts to suit your interests. Even when things are bad, you should come up smelling of roses." (Buchanan & Badham 2008, p.29)

So how do we know that people do not just write one thing in the minutes from a meeting and do another afterwards? How do we know that people really did what they stated in that presentation they were doing? The answer is that we do not. There might well be certain discourses and practices which are not reflected in the documents we can find. There might, if we use another term, be what we can call the "formal" and the "informal" discourses and practices surrounding an event or situation.

Therefore I will argue that the best way to uncover discourses and practices is through a combination of written documents and interviews and personal communication. Interviews have the advantage that by interviewing the people who were part of the discourses and practices one is studying, it is possible to illuminate issues which the written documents do not say anything about. It is possible to get the "unofficial" story which has not been written down. To make an illustrative example about this, let me describe the situation I experienced in an interview I did as part of the NorCOM case.

At the beginning of this interview when I asked whether I could record the interview and cite the respondent in the thesis. To this the respondent asked something like: Well, do you want the official history for the tape, or the real history? I chose the real history, and the tape recorder

was switched off for a long time during the interview. I was well aware that this meant that I could not cite the respondent and use the information from the interview directly in the thesis. However, it turned out, that by getting the real history with all the political games and struggles, all the intrigues, the information about who disliked who etc. as seen from the position of this respondent, I got a valuable insight into some of the issues, which I from my other interviews and written documents could see the presence of, but had had an incomplete picture of. Therefore I was capable of making an even better interpretation due to this interview, although it does not appear on the reference list in this thesis.

My argument is thus that by combining data from written documents and interviews and personal communication in the analysis it is possible to make the best interpretation of the discourses and practices in the case. I need now to turn to two issues, how do I make the analysis, and why do I say both interviews and personal communication? Both issues have to do with the phronetic approach to science about making a better interpretation.

A point which follows from the use of the Foucauldian approach is that the cluster concept, as well as the subjects in TIDK, is empty at the beginning of the analysis. It is through the analysis that the TIDK people are filled with content, and that the cluster is filled with content. This is a point I will make in detail in chapter 9. But still, it is very important to understanding the way in which I use documents of different kinds and interviews and personal communication. The point is that the analysis is about making the better interpretation of the discourses and practices through which the subjects within TIDK and the NorCOM cluster were constructed. And the better interpretation means a story of all the discourses and practices through which the subjects in TIDK as well as the NorCOM cluster were constructed, in which all the different voices in the case are heard. Therefore the empirical basis for the analysis is all the different sources of data which can help to create a picture of the discourses and practices. And therefore, in my analysis, there is no difference between empiric data obtained from an interview, a discussion in the lunchroom, a scientific paper, minutes from a meeting, a website, or a newspaper article. If either of these empiric sources contribute to the interpretation of the discourses and practices surrounding the people in TIDK and the NorCOM cluster then they are valuable for the analysis.

This means that just as I ascribe the same value to scientific papers as I do to newspaper articles when it comes to the analysis of the NorCOM cluster, so do I ascribe the same value to personal communication as to communication occurring in the setting called interview. The input I got from a chat with a person by the coffee machine would sometimes also give new aspects to the interpretation, just as the small discussions with people at meetings, over lunch or breakfast in the lunchroom at TIDK, or at TI conferences, where I participated in two, would. As an example of what it means to be in the environment for so many years studying an organization in a cluster, I can give the following example. I know the IT manager in TIDK personally because we were members of the same photo club and took pictures together in our spare time. And sometimes we would meet in the photo club, he would say, have you heard this or that, and the next day I would call some people in TIDK and ask on the phone, what is this, what is going on. And this also gave an understanding of the discourses and practices within the organization.

The arguments is thus, that information gathered over lunch in the lunchroom can be as valuable for the analysis as information obtained in interviews which are planned and follow an interview guide. To put this provokingly, I will argue, that whereas the conventional cluster researcher might reject knowledge obtained this way as anecdotal and valueless due to the lack of the vigorous methodology prescribed in parts of the interview literature, I will as a phronetic case study researcher argue that such knowledge can be as important as any other kind. And this is exactly because of the way in which objectivity etc. is understood within phronetic research. We should also note in this regard that Bent Flyvbjerg during his work on (Flyvbjerg 1998b),

which is a seminal example of phronetic case research, moved his work desk from the university to the organizations he was studying just to get near the people and engage with them. As he argued, the devil is in the detail, and this detail might well be something one overhears at a meeting or at lunch.

I therefore use interviews in my case study as well as personal communication, and this also means that I use Interviews in a way which differs from most of the literature in the conventional cluster literature. Let me now turn to this.

5.4.2 My use of interviews

(Kvale 2004) argues that the knowledge gained from interviews is created in the interaction between the interviewer and the respondents. It is not some sort of objective pure knowledge the interviewer digs out of the respondents through the interview, but instead knowledge is a social construct. And thereby (Kvale 2004)'s approach to interviews fits the Foucauldian approach and the phronetic approach to social science, because as I argued earlier, there cannot be any such thing as an objective truth – truth is a social construction and through his research the researcher is an active actor in the construction of the truth. In relation to the practical design of an interview, (Kvale 2004) argues for a seven steps approach.

The first step in (Kvale 2004)s approach is to thematize the investigation. In this step it should be established what the objective of the research project is, and this includes a clarification of research question which should be answered and the theoretical concepts used in the study. The second step is the design phase, where the content and the form of the investigation are decided on, and the investigation is planned in detail. This is the phase where it is decided who the respondents should be, and one issue in relation to this is typically the balance between accessing a representative number of respondents and the resources available to the investigation. It is also planned when and how the interviews will take place, how they should be transcribed, analyzed, verified and reported, in the later phases. The single interviews are also planned, interview guides with questions are developed, contact to the respondents established, interview time and form decided upon (face to face or telephone, for example). The third phase is the interview phase, where the interviews are conducted. The fourth phase is the transcription phase where they are transcribes in accordance with what was planned in phase 2, i.e. for example word by word or in summary form. The fifth phase is the analysis of the interviews, which again leads back to the first phase in which the theories and concepts and as such the analytical framework was developed. In the sixth phase the reliability and the validity of the data is tested. Finally, the seventh phase is the reporting of the results (Kvale 2004).

To understand how I use interviews it is necessary to note that (Kvale 2004) begins with a theoretical question which should be investigated, and therefore he is capable of planning the whole investigation in detail, i.e. deciding how many respondents should be interviewed to be able to generalize the results, choose these and make the questions for the interviews etc. My analysis starts out with empty concepts, the TIDK people as empty subjects and the NorCOM cluster as an empty concept. And it is through the analysis of discourses and practices that these concepts are filled with content. This means, that I cannot follow the seven steps prescribed by (Kvale 2004) in a linear way, where the first step is to specify what the investigation should investigate, in my case which practices and discourses I will uncover, and in the second step how many interviews of people that are necessary to do this. Because, I do not know at the beginning of the analysis exactly what I am looking for. This emerges along the way.

Since the objective of my interview investigation emerged during the study I had to use an approach to interviews which were more dynamically, going back and forth between the phases

(Kvale 2004). The critical reader might ask how I can do this. What are the consequences for how to choose the number of interviews in relation to the validity and the reliability of the results? To this I will argue, that this has to do with the phronetic approach to social science I use. Let me elaborate on this point.

What I did was to follow the seven steps, but go through them numerous times in the investigation. First I started the TIDK case by conducting an interview investigation with the goal to uncover the organization in TIDK, and what dynamics that occurred in the company, refer to the discussion in section 5.1.3. Then I designed this investigation, i.e. how many interviews did I need, who should I interview, and made the interview guides. Then I conducted the interviews and analyzed the data and held it in relation to the other empirical data I had collected, such as webpages describing TIDK, interviews from my master thesis during which I also interviewed a number of people in TIDK, information I had gotten in meetings in TIDK and information from small talk in the lunchroom in TIDK etc. From this I formed a better interpretation of what kind of organization TIDK was. And on the basis of this interpretation new question arose, and so I would go through the procedure again.

This means that I went through the method again and again. After the first few interviews were conducted and analyzed in relation to the other types of empiric data I had, I had developed a better understanding of the organization. And this then formed the basis for another round of interviews, followed by new reflections based on the data, and a better understanding of the discourses and practices within the company. And this then formed the basis for question for yet another round of interviews, which gave the basis for a new analysis and an even better interpretation of the discourses and practices etc.

Given that the objective of the investigation, i.e. the discourses and the practices were unknown at the beginning of the analysis, it is also necessary to reflect on how to uncover these through interviews, i.e. how does one pose question about issues one does not know anything about? In the interviews I conducted, both in relation to the TIDK analysis as well as in relation to the NorCOM analysis, I asked questions both related to practices and discourses. To identify events in the history of TIDK which had shaped TIDK over time, I started by using explorative questions about changes in the organizations. I asked about changes in relation to the organizational structure, the work, the management, the technology, the market, customers and supplier, other TI sites etc, i.e. all the dimensions I could think of. Coming from the outside, there were also dimensions which I was not able to think about and therefore I also used explorative questions such as asking the respondents what they saw as “the largest change” in the history of TIDK or “the most important change”. Due to the specific practice I came into TIDK with, being a geographer, finding myself surrounded by engineers and managers with completely different practices, there were many issues in their everyday I knew nothing about. And the only way to gain insight into these was through such open questions. The way in which (Kvale 2004) frames this is in his discussion of lifeworlds. Through my interviews I tried to gain an understanding of the lifeworld of the people in TIDK and understand their world. The interviews constituted, in other words, my journey into their lifeworlds, and through them I uncovered their practices and the discourses which surrounded them. So by asking these broad and unspecific questions I was capable of investigating whether there were dimensions I was unaware of. On the basis of the first series of interviews I was capable of starting to put together a picture of all the different changes in the organization and how they had been articulated by different groups within the company. One respondent might argue that one change was important; another would argue that another change was important and so forth.

I also used the interviews to ask the respondents which people in the organization that were important to interview if I was to understand the events, and which people that had been in-

volved in the events. By using this snowball approach I was able to form an overview of all the changes which had occurred, and reached a phase where I, judging from the responses, had identified all the events which had been important, i.e. caused a significant change in power-knowledge relations within the organization. At the same time I also started to make the questions more specific, posing questions which dealt in more detail with specific changes, for example how the changes specifically related to the work practices among engineers were seen by these, just to mention one example, or how manager saw the political game. Through such questions I could start to form a picture of how the events and the practices within the organization were articulated in the organization. This means, that my interviews both captured the discourses and the practice.

It should be noted in relation to the snowball approach, that new interviews are not necessarily with new respondents. This was because new question emerged as my interpretation of the discourses and practices grew and sometimes I therefore needed to go back to the same key persons several times to add new perspectives to the interpretation. I for example interviewed some key persons in the TIDK case several times, one of the top managers I interviewed four times, and one of these interviews lasted more than three hours. It should also be noted, that the snowball approach helped to avoid biases in the analysis because I did not only ask who people thought were important to interview, I also asked who were involved in events. And thus I was able to identify both who judging from the discourses was important and who, judging from the practices, was important.

I did the same in the NorCOM analysis. I did a number of interviews in the NorCOM cluster as part of a 4th term project I made during my degree, and also a number interviews as part of my master thesis which was also about the NorCOM cluster, and this gave me my first understanding of the cluster. As I started my PhD I did another round of interviews to understand the state of the cluster. Then I became involved in a research project beside my PhD research where Bent Dalum and I collected data on the NorCOM cluster through a series of interviews of key people in the cluster, and wrote this data into a report for a research project lead by researchers at Bocconi University. Therefore I had an understanding of the cluster when I started the Foucauldian analysis of the cluster, and the first thing I did was to analyze the newspaper articles and research articles dealing with the cluster. Thereafter I began to interview key people from the cluster. Here the approach in the interviews was to identify all the discourses and practices which had characterized the association over time. Also here I used open questions to identify discourses and practices, and the snowball method to identify new respondents.

Then comes the question of validating the results, and here I diverged from (Kvale 2004) prescriptions, because he describes in his account the interview method as it is used for theory construction. Since I use the phronetic approach to social science I have another approach to the issue of validation and generalization. As discussed earlier, validity in my research comes from the better interpretation, and therefore, the better an interpretation of the combination of data from the interviews and from the other sources of empirical data I had, the better the validity of the research.

The critical reader might ask here: how do you secure valid results and how do you know when to end this circle, i.e. how many interviews that are needed? The answer to this also follows from the phronetic approach to social science and the Foucauldian approach to the analysis. As long as the analysis of the previous interviews and other empiric data results in new knowledge about practices and discourses influencing the people in TIDK, then more interviews are necessary (as well as other empiric data). In other words, as long as the interviews add to a better interpretation, more are needed. When a state emerges where all the different voices in the case has been heard, to use the words of (Flyvbjerg 2001). It also shows in the interviews, because

they stop adding more aspects, or voices, to my interpretation of the discourses and practices. And this state was reached in both the analysis of TIDK and in the analysis of the NorCOM cluster. In both my experience was, towards the end, that I had identified and understood all the discourses and practices which had an impact. New interviews did not result in additional insights and when ask the respondents said that in their view I had touched on all the important issues and talked to all the key persons.

Before turning to the detailed description of the empirical data used in the TIDK story and the NorCOM story, it is necessary to reflect on another issue in relation to the use of the interviews: the ethical issue. As a phronetic researcher who through the research engages with a specific field in society, it is important to reflect on the ethical implications of one's work: what are the consequences for the people I interview, and if they want to stay anonymous, how can I protect their anonymity?

First, conducting detailed empirical investigations at the heart of Texas Instruments R&D organizations and at the heart of Motorola R&D organization at the same time posed one obvious challenge, and this was to make sure that I would not disclose information from one organization to the other. The work I watched was work on mobile phone which would hit the market far into the future, and therefore it was highly secret and valuable for the companies.

Another issue was the consequences for the individual people I interviewed. In the TIDK case everyone is anonymous, even to the point where they in single quotes are mentioned just as "engineer", "manager", "top manager" or "co-founder of ATL Research" or "engineer/manager". It is thus not possible to see whether the "engineer" who is quoted on one page in the story of TIDK is the same engineer or another engineers as the one who is quoted on the next page as "engineer". The reason for not naming them "engineer a" and "engineer b" and so forth was that the text had to be cleared by management in TI, and if the engineers were called "a" "b" etc. then it would be easier for the management to identify who "engineer a" was and so forth. Therefore the references are as they are in the story to protect the anonymity of the respondents. The reason why I marked the "co-founder of ATL Research" is that it was important for the reader to understand that this was one of the key persons in the story. This also means that all the interviews cited in chapter 6 and 7 does not appear in the reference list in chapter 11. In the final interview with the two top managers they agreed to be named Managing director and R&D director, which were their official titles. Of course, one should not be blind to the fact that the managers in TIDK knew who the people interviewed were and could guess a lot from the quotes. Furthermore, it was also in many cases the top managers who helped me to get interviews, especially in TI Nice and TI France. Therefore although I just stated "manager TI Nice", for example, they often knew who this manager was. Let me take an example, in the final interview of the two top-managers in TIDK, just before the closure of TIDK, we discussed a quote from a manager in TI Nice in the story, and the R&D director said the following:

"R&D DIRECTOR: ... And of course, I know the person who has commented that was a project leader, he of course has a different objective, he need to be strict on his budget, etc., and if he finds out, of course it is his responsibility to shout. Of course. No problem, so I accept that completely, I know that most likely it was [NAME OF TI NICE MANAGER] telling that.

KRISTIAN HEGNER REINAU: I don't know.

R&D DIRECTOR: I know, so this is perfectly fine, and this is exactly how and organization should work. You have somebody acting, somebody controlling..." (R&D Director & Managing Director 2009)

So all interviews were voluntary, and I tried to maintain the anonymity of the people, but in some circumstances this was impossible. I do not think that my interviews can have had any important negative consequences for any of the persons within TI and I have not heard from any that they got into trouble for helping me. The issue of whether the non-disclosure agreement and the clearance of the data had any consequences I will return to in section 5.4.2.

Turning to the story of the NorCOM cluster I decided not to make the interview persons anonymous. Again, everyone who is cited in the thesis volunteered to be interviewed and accepted that I used quotes from the interviews with their name. The reason for this choice is that there are relatively few key persons in the story of NorCOM and due to their specific roles as CEO of this or that organization, or chairman etc., it would have been impossible to tell the story in a way which meant that the respondents remained anonymous and still maintain the desired level of details. Luckily almost everyone was happy to tell their stories. And this actually also caused a methodological challenge which I will turn to, because my analysis of the NorCOM cluster showed that the people in the cluster had been constructed in a specific way due to a common history and heritage in the cluster, and therefore many told similar stories. Therefore written documents, especially news paper articles, proved to be very important in the analysis, because through these I was able to uncover practices and discourses which was not part of the joint history told by the people in the cluster. A specific example is that a discourse about a lack of business competences in the cluster disappeared from the discourses around the cluster, and this can be shown through analyzing newspaper articles. This goes back to the issue which I started this section 5.4 by discussion, which is that written sources and interviews each have their strengths. The NorCOM case thus illuminates the methodological importance of combining these.

There was however some aspects of the story in the NorCOM case which some respondents did not wanted to be cited for. Also, there were a few respondents, who wanted to remain anonymous, and therefore in one case I have made the respondent anonymous, and in another case I have not used the interview directly in the written text.

I have now discussed the challenges in the empirical investigation in this thesis, the use of empiric data and the use of interviews. Now it is time to turn to a more detailed description of the empirical basis for the analysis of TIDK and the analysis of the NorCOM cluster.

5.4.3 Empiric data collected for the TIDK story

To understand the nature of the changes occurring in TIDK I interviewed top managers, middle managers and engineers. I chose engineers and middle managers from different fields within the company, i.e. hardware, software, tools and solution delivery, to gain a broader understanding of the changes the company experienced. I also chose managers and engineers so that I both interviewed people who had been with the company since the ATL Research time, who could therefore talk about how the company changed through the years. And people who came to the company from other companies within and outside the cluster after the acquisition, who could therefore tell me about whether the company was different compared to other companies within the cluster and outside of the cluster. The idea of choosing people coming from outside the cluster, and in one case from France, was that they were able to talk about the practices and institutions “NorCOM engineers” took for granted, due to the fact that these outsiders had to learn these and therefore were aware of them.

When I interviewed people from TI Nice I also chose both engineers and managers for the same reasons. After the closure of TIDK I also conducted interviews with the three founders of ATL

Research to get their reflections on the history of the company and my interpretation of this. As part of the analysis of TIDK I, all in all, conducted 23 interviews in TIDK, 7 interviews in TI Nice, two interviews in TI Dallas and three interviews of ATL Research founders, totalling 35 interviews of varying length.

The respondents in TI Nice and TI Dallas was also identified using the snowball method, and managers from TIDK gave me contact information to key people at the two sites, and put in a good word for me, thereafter I called the sites and arranged the interviews and also used the snowball method to arrange further interviews. The interviews of people in TI Nice and TI Dallas was conducted by telephone, because the short window of opportunity meant that there was not time to arrange to travel to the two places. To get the most from the opportunity I interviewed the people by phone and focused on transcribing and analyzing the interviews so I could write the story of TIDK from the outside and get it cleared for publications.

These 35 interviews were interviews which were recorded and analyzed afterwards. Some of them were transcribed completely while others were only partly transcribed, so that some parts were transcribed word by word and other parts were only transcribed in summary form⁶. The reason for this was that I around the closure of TIDK was under pressure to finish the story as fast as possible because TIDK could close any day and thereby render my work un-publishable. Therefore I did not have time to make full transcriptions. It should be noted that I conducted, transcribed and analysed all the interviews myself. Some of the interviews in TIDK were conducted in Danish, and therefore I personally translated all the Danish quotes in the story of TIDK and TIDK from the outside into English and included them in the stories, so that these translations were also cleared for publication.

Thereby the original Danish transcription is available for Danish reader and my English translation available for an international audience. I have chosen to do this because I analytically focus on discourses and thus how things are articulated, and therefore I believe that it is valuable to have the original statements in the text and not only my translation which in some circumstances may not capture the exact nuances in the Danish quote, although I of course sought to translate the quotes as precisely as possible. It is the same issue in the secondary literature on Foucault; sometimes his French quotes are mentioned in English books, because some nuances are lost in the translation.

Regarding the use of telephone interviews, it should be noted, that this type of interviews has some limitations compared to face to face interviews since a lot of information is lost (Kvale 2004). The information exchanged in a interview is not only what is said, facial expressions and body language also convey a lot of meaning (Kvale 2004), and this is also why it is an error to believe that a word by word transcription of an interview holds all the information from the interview. However, given the situation at the time of the interviews, it was not possible to conduct face-to-face interviews in Dallas and Nice. Another issue in relation to telephone interviews is building trust and getting the respondent to talk. During the analysis in TIDK I had heard a lot about the French work culture, and French people being difficult to communicate with. Therefore when I called people in TI Nice, I said hello and presented myself and my objective in French, thereafter I apologized for my poor French and asked if we could do the interview in English. It is my impression that this really made a difference to the people I interviews, because after this short effort to speak their language they were very helpful and open to me. It seems that this small gesture and acceptance of their culture made a big difference.

⁶ It should be noted that the analysis had a 36th interview, but this was with a top telecom researcher at AAU and the goal was as mentioned earlier to gain basic knowledge about the technology with which TIDK worked, and it does as such not occur in the TIDK story.

Interviews were as mentioned only one source of data used in the analysis around TIDK. Meetings with people in relation to the arrangement of the case study and legal contracts, small talk in the corridors and conversations by the coffee machine when I visited the company, phone calls to different people in the company to get updates on the status of the company in uncertain times of downsizing etc. also became a source of understanding the changes that had occurred and were currently ongoing. The same held for observations at the meetings surrounding the R&D project I followed and the knowledge sharing conferences. During the years where I followed TIDK, two TIDK conferences were held, each lasting two days, and I participated in both. I also collected a number of internal documents and presentations describing the company, its organization, products etc. I also tried to gain access to email traffic in the company, but this turned out to be impossible after negotiations with TI. I also identified and analysed a large number of newspaper articles dealing with the company. I collected a large number of newspaper articles myself using primarily the Infomedia database as the tool⁷. In this database I identified 80 newspaper articles mentioning TIDK as well as 53 articles mentioning ATL Research. Apart from this I also found a number of online articles and websites dealing with TIDK using Google and other search engines. Finally, I also got access to a large archive of newspaper articles, reports, advertising material etc. which Bent Dalum and Gert Villumsen from the business department had collected through all the years they were studying the cluster. After the death of Bent Dalum, I inherited this archive. Data from all these sources was put together in the analysis to write the story.

Part of the data that formed the basis for this TIDK story was collected in TIDK before the announcement in October 2008 that TIDK was put up for sale. In the spring of 2009 the data in TI Nice and TI Dallas was collected, and this was thus done after the announcement that TIDK would be closed and that several other sites in TI would be significantly downsized. One could argue that their situation at the time meant, that they would be biased in their views. One could, however, also argue that people in TIDK in 2008, where they were fighting for their jobs, were in a situation where they were biased in their views. I will argue that given my approach to the analysis, where I investigate the different views, the issue of biased statements was not a serious issue because they stood out compared to other statements by other respondents.

The situation in 2008 where TIDK was about to be shut down, TI Nice and TI Dallas downsized, and many projects involving these three sites and other sites in TI would be terminated, gave an once-in-a-lifetime possibility to interview people regarding power relations between the sites and the struggles for positioning among the sites. Because of the new strategy decision made by the top management of TI, which resulted in the closures etc., all these struggles, positioning strategies of the sites etc. lost their value overnight. This meant that in the time window between the announcement of the closures and the actual closures, where I conducted studies in TI Nice and TI Dallas and discussed my findings with top management in TIDK, people in TI had time and were willing to talk about the political struggles that had been going on in the corridors in previous years. This added a new layer of understanding to my findings, and it is important to say that the data collected in this phase fitted the previously collected stories, and gave them more depth. This also suggests that people were not biased in their statements.

Finally, it is necessary to discuss the issue that the managers in TIDK had to clear the stories. The critical reader might wonder whether the stories are thus censored by TI? But this is definitely not the case. The procedure was that I wrote my stories and showed them to the top managers in TIDK. Thereafter we discussed them and this turned out to be a very important point, given

⁷ The Infomedia database is the largest article database in Denmark covering printed as well as online media (www.infomedia.dk 2011)

the approach to phronetic science and the objective of creating better interpretation, because this step led to fruitful discussions where the top managers added perspectives. For example they commented if they had a different understanding of some issues, gave their perspectives on some of the issues in the story, and pointed out if some technology issues needed more explanation to be understandable for the reader etc. This means that after having written the story and received inputs from the managers, I added some final details and got the stories approved.

There were only very few points, where the managers wanted something to be left out, and this was small issues that did not make any difference to my story. I was actually very surprised about how much I was allowed to publish in relation to critical points about TI. Of course the critical reader might argue here: Have you not been critical enough in your analysis since they could accept it? I would argue two things to this. Firstly, the reason why they accepted the stories could also be a sign that I through the phronetic approach had managed to make all voices heard in the case. So that, although there were critical points about TI in the text, there were also the “answers from TI”, and as such the texts emerge as a balanced description of what happened, good and bad things taken into consideration. Secondly, given the complete closure of TIDK and many of the activities within TI which TIDK was involved in, it is also likely that what emerged as critical points about TI in the case could be cleared because the things they were dealing with, for example, the difficult relationship between TIDK and TI Nice would be history with the closure. So all in all the fact that the stories has been cleared for publication does not mean that the stories have been censored. Let me now turn to the data used in the analysis of the NorCOM cluster.

5.4.4 Empiric data collected for the NorCOM story

I have been following the NorCOM cluster for many years; I did a project about the cluster as part of my bachelor's degree in the spring of 2004 where I interviewed a number of key people in the cluster. I did my master thesis about the cluster in the fall of 2005 where I also interviewed a number of people in the cluster. At the beginning of my PhD in 2006 I did a number of interviews in the cluster to get an overview about what was happening in the cluster. The first two papers I wrote as part of my PhD study were about the cluster (Reinau 2007a;Reinau 2007b) In 2007 I also conducted a number of interviews of key people in the NorCOM cluster with Bent Dalum for another research project on the basis of which we wrote an internal report. Furthermore, with Bent Dalum I also wrote another paper in 2007 about cluster typologies and power using the NorCOM cluster as the case (Reinau & Dalum 2008). While I was conducting my research of TIDK and Motorola in 2007 to 2009 I also continually heard about what was going on in the cluster and meet people from the cluster at receptions and meetings. So from 2004 to 2011 I have been following the cluster closely, talking to people from the companies, the NorCOM association and the university regularly about the situation within the cluster. To follow the dynamics within the industry I have amongst other things subscribed to the Cellular-News' e-mail based newsletter since January 2008, which on a daily basis (www.cellular-news.com 2011).

And all this constituted my background knowledge when I started the analysis of the cluster found in chapter 8. The data forming the basis for the analysis is a number of interviews, much personal communication occurring in different settings, minutes from meetings in the NorCOM association, minutes from meetings of the board of the NorCOM association, newsletters from the NorCOM association, newsletter from the electronic systems department at the university and literally thousands of newspaper articles as well as a number of scientific articles and reports dealing with the cluster.

I used some of the articles in Bent Dalum and Gert Villumsens archive on the NorCOM cluster and its companies. And more importantly, using the Infomedia database as well as searches on Google, I personally identified, read and analyzed 845 articles mentioning Dancall, 1128 articles mentioning Flextronics, 205 articles mentioning Bosch Telecom, 57 articles mentioning Mindwork, 119 articles mentioning NorCOM, 179 articles mentioning Digianswer, 121 articles mentioning Cetelco, 67 articles mentioning Freescale and many more. The examples here are just to give an insight in the number of articles used. I also used a number of scientific papers mentioning the NorCOM cluster; the references to these can be seen in chapter 8.

From these written sources, as well as my previous knowledge about the cluster stemming from the years leading up to 2009, I constructed my first interpretation of how the NorCOM cluster emerged. Thereafter I did a number of interviews of key people in the cluster, which I identified using the snowball method. These interviews of key people turned out to be enough to complete the interpretation of the discourses and practices through which the NorCOM cluster was constructed.

The following interviews were carried out: I interviewed Flemming Eriksen, who had been the CEO of Siemens, BenQ and Motorola in the cluster. I interviewed him three times after the closure of Motorola and the termination of my case study at Motorola. The objective was to get his reflections on this and the cluster, but due to uncertainties regarding the relationship to Motorola, I have decided not to use the interviews directly in the analysis. However, these interviews helped my interpretations in the analysis. I also interviewed Jepser Jepsersen who is the managing director of NOVI due to NOVI's role in the history of the NorCOM association. Jørgen Bach Andersen who is a consultant at department of electronic systems at AAU, and previously was professor at the same department, has been a key person at AAU in relation to the NorCOM cluster as the analysis in chapter 8 will reveal, and was therefore also interviewed. Jørgen Hedevang who is a consultant, has also had a key role in the NorCOM cluster over the years constituting for example the secretariat of the association through a large parts of the history, so he was also interviewed. Niels Buus, who was the CEO of Gatehouse for years and also the chairman of the NorCOM association for a period was also a key person and was also interviewed. It should be noted that I had interviewed Niels Buus twice earlier for my thesis and during my master thesis. Niels Christian Gjerrild who was the CEO of a number of companies including Ericsson at one time, and also the first chairman of the NorCOM association was also a key person. Rauf Sørensen and Erik Sørensen the two founders of Cetelco were also interviewed due to the key role of Cetelco in the early years of the NorCOM cluster. Sven Vestergaard, CEO of AM3D and the last chairman of the NorCOM organization before the merger with IT Forum was also interviewed in relation to his role as the last chairman. Further, I did two interviews with two other key people who wanted to be anonymous, one from the university, and one who did not want his/hers position to be known.

As in the analysis of TIDK all these interviews were recorded, but due to the time and resources available I transcribed parts of them completely and other parts as summaries. For similar considerations as in the TIDK analysis, I have chosen to bring both the original Danish words when they are quoted as well as a translation. The same goes when Danish newspaper articles are used.

I also obtained access to all minutes from meetings in the NorCOM association, all minutes from meetings of the board of the NorCOM association, as well as many newsletters from the NorCOM association from 2000, where the association was made formal through a general assembly, and until the merger of the NorCOM association and the IT Forum in 2009. The parts of the analysis where I use these sources in the analysis has been cleared for publication by Sven Vestergaard in

his capacity as the last chairman of the NorCOM association. Having now presented and discussed the empirical data used, it is time to turn to the analysis.

Part III: Case Study

Chapter 6: The story of Texas Instruments Denmark

(This chapter comes from document which has been cleared for publication by TI. Therefore I have been unable to change anything in it, and therefore when sections are mentioned it refers to sections within this chapter. "Section 3" thereby refers to the section "3 Technology" within this chapter. This is also why the numbering is not made with the chapter number as the beginning as in other chapters in this thesis)

This chapter is going to the story of TIDK to illuminate how a company changes behaviour when it is acquired by a multinational, in this case TI, and hence becomes part of a multinational corporation. Texas Instruments Denmark opens with two people in an apartment in Copenhagen in 1965 becoming part of TI. The story we are interested in begins when Texas Instruments acquired the company ATL Research in Northern Jutland in 1999. This acquisition marked the entry of TIDK into the wireless area, and this chapter is going to tell the story of this branch of TIDK.

This story, beginning when ATL research was acquired by TI in 1999, ending when the Aalborg department of TIDK, from here on just referred to as TIDK, as well as other assets in TI was set for sale in October 2008, is a complex and interesting story about how an acquisition by a multinational corporation changes the behaviour of a company within a cluster. It is a story about changing wireless technology and changing markets for this technology. It is also a story about a changing company. TIDK 1999 compared to TIDK 2008 was two different companies. The competences of the company had changed, and so had the organization of the company, the place of TIDK within TI, TI itself and TI's customers and suppliers. The feelings of the employees did also change along the way. Many employees from TIDK 1999 were still present in the company in 2008 but their feelings regarding the company and their work were different. And finally, the region housing TIDK, North Jutland, and its so-called NorCOM cluster of telecommunications companies changed during these 9 years. The following sections will tell the story of these changes, and to understand the story it is necessary to start with ATL Research.

1 ATL Research

The story of ATL Research can be traced back to Cetelco, a rather large company in Northern Jutland, producing mobile phones. Cetelco had a radio frequency (RF) department, consisting of engineers working on the radio part of the mobile phones. A number of these engineers knew each other from Aalborg University. Among these were two engineers who had graduated together there in 1991, and who both got jobs at Cetelco afterwards. We shall return to these two persons later, as they would become two of the three founders of ATL research. When the two engineers were employed at Cetelco they found themselves employed by a company experiencing relatively large internal turmoil, as one of them recalls. Some of this turmoil was caused by an owner change. Cetelco was originally owned by a larger company in North Jutland specialized in maritime telecommunication equipment, but was later sold to a German company Hagenuk owned by a large German concern Preusak specialized in the steel and chemical industries. As one of the engineers recalls, Cetelco was sold to the Hagenuk, which, quote:

"...was a German company, and a German company which was primarily owned by Preusak, which is big in both steel industry and chemical industry I think. Crude heavy industry, so one can say that Hagenuk did actually not fit so well into their portfolio, but they had big pockets, and they needed that too, so they poured one billion after another into Hagenuk"
(Engineer at Cetelco, later co-founder of ATL Research)

Hagenuk had a long history in Germany. Before the liberalization of the telemarket in Germany Hagenuk had been the sole supplier to the German network supplier Deutsche telecom. After the telemarket in Germany was liberalized Hagenuk experienced competition from other companies and the expenditures rose. According to one engineer from Cetelco the situation was that Preusak continued to pour lots of money into Hagenuk, but at a given stage the pain-threshold was reached, and Preusak sold Hagenuk for almost nothing, and focused on steel and chemical industry again.

Hagenuk, including Cetelco in northern Jutland, was then brought by a German financier, who wanted to turn the situation in the company around. What actions he took to do so is outside the scope of our story. What are important are the consequences of his action in the RF department in Cetelco. The leader of the department found him in a situation where he spent most of his time making time-schedules and changing these due to the turmoil in the company, which caused personal dissatisfaction. The engineers in the RF department began to see the new financier at the top of the firm as a "jumping jack". One of the two engineers from AAU explains, quote:

"And then this new 'jumping jack', who wanted to make it all run, he was completely impossible. We were down for a meeting in Germany also, where he just stood and acted stupidly. Then we could see, that this was only going in one direction, and that was the wrong, that we had no influence on what was happening, and that nobody wanted to listen to us. Then we looked a bit at each other, said "ahh, shouldn't we start something for us selves?'. Yes we said, so after we had decided to do so we went into the CEO's office and said that we wanted to quit." (Engineer at Cetelco, later co-founder of ATL Research)

The competences found in the RF department of Cetelco were some of the core competences of Cetelco, since it was the employees in the RF department who were designing the radios used in the phones produced by Cetelco. Further at the time the RF department in Cetelco consisted of only 5-6 engineers at the time, of which one other was already in the process of leaving. That the leader of the RF department along with the two engineers decided to start their own company therefore came as a chock for the CEO of Cetelco.

We shall here notice here is that the engineers decided to leave due to a uncertain situation in which they felt that they was not able to influence the situation, that nobody was listening to them, and that they were making and re-making time-schedules. We shall later see a similar situation unfold inside TIDK.

The three engineers left Cetelco and stated their own company ATL Research in 1996. The new company was firstly located in rooms at the local Science Park NOVI. The three founders did not have a precise idea for the business area of the new firm. One thing they knew, according to one of them, was that the future was wireless, so to say. They could see that another local company in the area, RTX Telecom was doing well working with the DECT technology. However, the founders had to choose among many available wireless technologies. One of the founders recalls, that they did not, at that time, see the GSM technology as a core technology in the firm. The reason for this being uncertainty regarding the relationship to Cetelco. The founders were uncertain whether work on GSM in ATL Research would compromise the competition clause they had with Cetelco. Therefore a number of ideas for business areas were in play. One was wireless reading of meters in district heating systems. This idea was however never pursued in practice. Another idea which was, was to produce equipment for finding pipes in the ground using wireless technologies, which would be able to located dug down pipes more precise than existing equipment for such tasks. Another example was the use of wireless technologies in cable TV infrastructure. ATL worked for Scientific Atlanta on a project to develop modems with wireless control, so that

a central office could switch the TV-packets available at a given customer though wireless technologies and therefore save sending a technician out to do the switching manually. This project was quite challenging, as one of the founders remember, due to the high standards regarding noise etc. which had to be kept down to avoid interference with the TV-signal. The GSM technology was not in focus at this time. However, as the history will show us, it turned out to be so in the end. Let us therefore look at the events placing GSM technology in the core of ATL Research. Again we have to go back to Cetelco. One of the founders of ATL Research said during an interview:

“I have always said that Cetelco should have had support from the minister of education, because Cetelco was really doing education activities. People was coming out from Aalborg University, then they would work for Cetelco, being there for a couple of years in which they were really learning how it was to be in the industry, and the things that was specific regarding the GSM area, and then they would disappear to USA, Germany and so forth.” (Engineer at Cetelco, later co-founder of ATL Research)

Some of these engineers that left Cetelco had gone to work for Sony, which at that time had a development site in Munich Germany. Sony at the time lacked the RF capabilities needed for producing a working RF solution to their phones. They had made working phones in cooperation with Siemens in Germany, where Siemens had helped them out with the RF technology. After this cooperation Sony tried to make a working phone on their own. The project did not go well; Sony could not make a working RF solution. Therefore they went back to Siemens and got help for the RF part again. After this Sony began work on yet another phone on their own, and again they got into problems with the RF solution. Instead of going back to Siemens, some of the ex-Cetelco engineers, now working for Sony, suggested that Sony should contact ATL Research. The ex-Cetelco people knew from their work at Cetelco, that the engineers at ATL Research were good at producing RF solutions. One of the founders of ATL Research recalls with laughter, that just few weeks after ATL Research was opened in rented offices at the local Incubator “NOVI”, a delegation from Sony arrived in almost completely empty office rooms to visit the company. Despite this, ATL Research managed to get a contract with Sony, and this was how ATL Research entered the GSM field.

At this time ATL Research functioned as a consultant company, where the employees was working on hour-basis on different projects, the contract with Sony being one among many ongoing projects. The project with Sony went well, and therefore information was spreading within the industry that ATL Research was capable in RF solutions. After a while Acer from Taiwan contacted ATL Research. Again the issue was to produce the RF solution for a GSM phone. Later Hutel also became a customer.

The projects with Sony and Acer, amongst others, brought ATL Research into the GSM field. Let us now look at the dynamics that would eventually lead to the takeover by TI. On the first project with Sony ATL Research worked primarily on the RF solution. On the second project with Sony work was expanded to cover some of the baseband also. The RF solution was based on chips from Analog Devices, while the baseband solution was based on components from Siemens Semiconductors⁸. On the Acer project Analog Devices also supplied the RF components, Siemens the baseband and software. One reason for the use of these suppliers was that these companies discovered the existence of ATL Research. Cetelco had used both Analog Devices and Siemens Semiconductors as suppliers, so when the RF people left Cetelco, these companies started searching for them, and this combined with the rumors about ATL Research in the industry lead

⁸ Siemens later spun of their semiconductor activities into the company Infineon.

to ATL Research being discovered as a potential customer by these semiconductor companies. As one of the founders recalls:

"So there was a lot of contacts [in the industry] who discovered that we were gone, and therefore started searching for us. Therefore we had a huge cooperation almost from day one with both Siemens Semiconductors and Analog Devices" (Engineer at Cetelco, later co-founder of ATL Research)

Here we should remember that in the beginning the founders did not have a clear idea for the business area, but as this quote shows, the past from Cetelco so to say caught up with the founders, they were "discovered" by the semiconductor companies they had been used to working with. The work on the Acer and Sony projects went rather well. These were relatively large companies and therefore they could put pressure on the suppliers, i.e. Siemens Semiconductor and Analog Devices, to obtain solutions well fitted for the project. Hutel on the other hand was a small start-up company lacking such power. To make matters more difficult, Hutel wanted Siemens Semiconductor RF, TI hardware and protocol stack from Condat. One of ATL founders described this situation as a "tumult" or "hullabaloo"⁹. Condat at this time was preoccupied with other projects, and had little time for TI and the small customer of TI, Hutel¹⁰. This situation where TI felt that Condat was too unfocused in their work would eventually lead to the acquisition of Condat by TI, which we shall hear more about later.

ATL Research was constantly scanning the market to see which suppliers offered the best solutions. What the people in ATL Research noticed at this time, was that TI had some good products, more specifically some good evaluation boards. However, these were good with one important 'but', which was that the whole module connecting the antenna to the baseband, i.e. the RF module of the boards, was missing. This was an important limitation, because at this time it was difficult to obtain a good RF module on the market. ATL Research was capable of producing such a module, and they had done it before. Both to Siemens Semiconductors and to Lucent, and because of this ATL called the module the "SL module", S and L denoting Siemens and Lucent. ATL Research therefore began selling the "SL2" module to TI, so that TI could fill the hole in the designs they made available for their customers. The number 2 indicates it was the second generation of module developed for Siemens and Lucent. TI at that time did not know this, and one of ATL's founders recalls, that TI was asking for SL2 modules, without knowing that they brought a module developed originally for Siemens and Lucent.

The first business between ATL Research and TI therefore emerged, when TI stated buying these SL2 modules which ATL Research produced. From TI's perspective, TI needed to sell RF solutions, such as these SL2 modules, to their own customers, just as they were selling the protocol stacks brought from Condat to their customers. Therefore TI wanted to obtain a license from ATL Research to produce and sell such modules. The founders of ATL Research knew that if TI obtained such license, then there would be no business left for ATL Research. They therefore said no to this. And as one of the founders of ATL Research recalls, the founders of ATL Research told TI, partly in fun, that if TI wanted such "license", then they would have to buy ATL Research. And so TI did in 1999.

⁹ These two words together convey the meaning of the Danish word "gedemarket" which the founder used in the interview.

¹⁰ Since Condat delivered software for the hardware produced by TI for the ATL project to Hutel, it is possible to say that TI was a customer at Condat in this project.

2 Texas Instruments Denmark

To tell the story of TIDK we need to begin by sketching out the broad lines in the story. When we look at how TIDK changed through time three phases emerge:

- I. 1999-2002: Early years
- II. 2002-2006: Growth years
- III. 2006-2008: Decline years

The first phase runs from the acquisition of ATL Research in 1999 and until around 2002, where Condat and parts of Telital was acquired by TI, and TIDK therefore experienced a severe increase in employees. This first phase can be coined the early years. Here business proceeded like in the ATL Research time. The organization of TIDK was relatively much like it had been in ATL research. The wireless technology and the work tasks of TIDK also stay relatively much like they had been before. The mobile market experienced growth, and the employees in TIDK were part of a big organization with relative lots of money for R&D in the field where TIDK was operating. This phase is remembered by some in TIDK as the happy days or the golden days.

The second phase starts around 2002 and may be called the “growth years” where the number of employees in TIDK rises. This is especially due to the infusion of employees from Condat and Tellit, two companies acquired by TI in 2002. This leads to a new organizational structure within TIDK that with these acquisitions contains “three companies under one” organizationally as one manager described it. The success experienced by TIDK in the first phase leads to TIDK being increasingly involved in political games within TI, and the new size of TIDK further puts the activities within TIDK under control from TI. TIDK hence becomes more “TI-ed” in this phase. The growth of TI in general in this phase leads to a reorganization of TI in 2004, called Crystal, the objective of this being to make the organization of TI more clear. This influenced both the organization within TIDK as well as the place of TIDK within TI. Growth continues, and in 2006 TIDK reaches its maximum size with around 200 employees. The wireless technology is also changing in this phase and so are the market with has consequences for the employees in TIDK. The technologies the engineers are working on are developing and maturing, and changes in the market means that less money are available for R&D activities within the field where TIDK is operating.

The third phase from the summer of 2006 until the end of 2008 is characterized by decline. In the summer of 2007 1/3 of TIDKs employees, mostly software engineers, are laid-off due to reorganizations within TI. This marks the end of 8 years with growth in the company, a quite remarkable accomplishment for a company operating in this industry. The prizes won by TIDK in this phase further tell about this quite remarkable accomplishment. Three times in a row, in 2004, 2005 and 2006, TIDK won a Computerworld prize for the best growth in Denmark. Computerworld is a Danish IT newsmagazine. Further in 2005 TIDK won “Amcham Denmark Business Award 2005”. The lay-offs changed the feelings among the employees in the company. Changes in technology leading to some competences in TIDK losing their value as well as changes in the market leading to declining income for players in the industry results in a situation where budgets and time schedules was tight. Where engineers had limited influence in the tasks they are given or how to solve these tasks. Some engineers were then looking back at the ATL Research days and early TIDK days with a feeling of what one might call nostalgia. These were the fun days and the golden days. These were the days where people were putting long workdays into their work. Working for TIDK In the end of 2008 was clearly another “job” in the minds of the engineers.

What events along the way that made TIDK go through these three phases? The following sections will tell this story. This story will give us detailed insights in how one company, located in a cluster, ATL Research, changed its behavior after it was acquired by a multinational corporation, TI.

Let us begin the story by taking a look on how the wireless technology and the market for mobile phones have changed through these phases, i.e. the 9 years from the acquisition in 1999 until TIDK was set for sale in 2008. Some of these changes have been gradual cutting across the phases mentioned above. It is therefore useful to present these changes in technology and market in the following two sections, because this will form the background necessary to understand the organizational changes and political struggles experienced by TIDK through the three phases, which will be the focus for later sections. These following sections will in turn make it possible to understand what caused the changes in the feelings of the engineers towards their work.

3 Technology

To understand the core competences of TIDK in the early years, let us have a look at the company TI acquired, ATL Research. The core competence in ATL Research was knowledge about radio technology, particularly to TDMA (Time Division Multiple Access) which is the technique the GSM system operates upon, and GSM system knowledge. The core of ATL Research was a combination of people who could make a radio work and people who had the system view needed to put all the parts in the phone together. One example of a project running at the time of the acquisition, utilizing these competences, was a project for the watch producer Swatch, with the aim of incorporating a mobile phone into an arm-watch.

ATL Research was an economically healthy company, which could have survived longer on its own. However, and this is impotent to note, most likely only a couple of years given the technological development in the industry. One of the founders of ATL Research explains:

"We would probably have earned some more money on selling the company had we waited a year selling it. But if we had waited 2 years then we would probably have earned some less had we sold it. And there is no doubt that it would, either we would, well, it is difficult to know of course, but, offhand, my guess is actually, that we would have gone down at some point, or simply have had to close the firm had we not sold it, because today there is absolutely no market for that type of firm...

... What really gave the big turnover, and was as I say our core-competence, it was RF for sure and that we could have used in other areas, but our system knowledge about GSM we can, for good reasons, only use in relation to GSM. And that would have gone up in smoke."
(Founder of ATL Research, later manager in TIDK)

This GSM competence would have evaporated because TI and other players in the field would have build up such GSM system capability themselves. Actually, at the time where ATL Research was acquired TI had already other departments working on establishing such competence, and these projects were terminated after the acquisition.

That TI brought a RF competence and GSM system competence in ATL Research also meant that the other activities ATL had been pursuing were cut down over time. The sales and marketing director in ATL Research disappeared quite fast when TI took over the company, but the company was allowed to finish the projects they had stated on with other companies.

To understand how the ATL Research fitted into the portfolio of TI when it was acquired, it is, according to a manager, possible to use a jig-saw puzzle metaphor:

"The jig-saw puzzle is maybe pretty good [AS A METHAPHOR]. Well, if you took ATL Research, there we were one piece that had to fit into some procedure surrounding the customer. Then we was acquired by TI, that was a giant jig-saw puzzle, with many pieces which were maybe not fitting so well together. Because TI stated in 99 by entering the wireless market. They were in it partially with their base band application processor, but they did not have the RF, and now they wanted to buy the RF competence, which was why they bought ATL. So one can say that the piece, it was, when it stated in 99, we fitted in quite fast after half a year of work and synergy with TI. From 99 that piece fitted in as a delivery on the RF. Since then it has developed into the piece being bigger and containing the platform we deliver, the development platform, the piece of hardware I told about. So one can say that the piece has grown to contain a system platform that represents TIs chipset. And that is more or less where we stand today." (Manager)

"Puslespillet er måske egentligt meget godt [som metafor], altså hvis du tog ATL research, der var vi jo en brik, som sådan set skulle passe ind i et eller andet kundeforløb, ikke. Så blev vi opkøbt af TI, det var et kæmpestort puslespil, men en masse brikker som måske ikke lige var sat sammen, fordi TI startede der i 99 med at ville ind på wireless markedet, de var derinde delvist med deres baseband applikationsprocessorer, men havde ikke RFen, nu ville de købe RF kompetencen, det var derfor de købte ATL, ikke. Så man kan sige at den brik, den blev så, da den startede i 99, jamen der passede vi ret hurtigt ind efter et halvt års arbejde og synergi med TI, ikke, fra 99, jamen så passede den brik ind som en leverance på RFen. Sidenhen har det så udviklet sig til at den brik er blevet større og indeholder den platform vi leverer, altså udviklingsplatformen, det stykke hardware som jeg fortalte om, ikke. Så man kan sige brikken er vokset til at indeholde en system platform der repræsenterer Tis chipset. Og det er sådan set mere eller mindre der hvor vi står i dag"

The core area for TIDK has been to produce reference designs for mobile phones which could be sold to costumers. The idea of a reference design is in brief; to make a design for a printed circuit board (PCB) with all the components needed to make a using phone, which can be sold to costumers who can then use it as a basis for production of mobile phones. We can roughly distinguish between two types: a reference design and a form factor design. A form factor design is also a reference design, but here the PCB is in the physical shape which will go into the phone, and the components are located as they will be in the finished phone. This is what there is referred to in the quote above as a development platform.

Demands to the quality of such reference design and produced boards are high as they need to satisfy different demands among for example software developers and RF engineers within TI as well as costumers outside TI, as one manager explained:

"... a software developer has to use it [THE PLATFORM] as a stable platform upon which to develop his software development. A RF engineer has to use the platform for benchmarking the RF performance, how good sensitivity you have, if you can transmit with the necessary power and such stuff. The customer should be able to connect some modules to the platform to put his own ID on the product, it means, he is maybe sitting and developing a unique camera, and on the platform there is a slot where he can connect it. So this means that the platform has a multi-role function. And that is where the challenge is, because it is extremely expensive to develop these platforms. Not so much just the price itself, but the whole logistics. And the aspect, that if there is a bug, if there is an error in the platform, then it has an immense effect because the costumers can lose their trust in us. But it is also very sensitive in the way, that if there is no appurtenant software delivery which supports all these functions, then the platform is actually only half usable." (Manager)

"... en software udvikler skal kunne bruge den [Udviklingsplatform] som stabil platform, til at udvikle hans software på. En RF ingeniør skal bruge platformen til at kunne benchmarke RF performance, altså hvor godt følsomhed har du, kan den sende med det nødvendige effekt og sådan nogle ting, ikke. Kunden skulle meget gerne kunne bruge platformen til at sætte nogle moduler i så han kan sådan set sætte sit ID på sit produkt, det vil sige at han kan sidde og udvikle måske et unikt kamera, ud på platformen hvor han har et slot til at sætte den i. Så dvs. der er den her multirollefunktion på sådan en platform. Og det er der udfordringen er, for det er sindssygt dyrt og fremstille de her platforme, ikke bare som meget at det er selve prisen på det, men hele logistikken, og det aspekt i hvis der er en bug, hvis der er en fejl på platformen, så har den kolossal effekt på at kunderne kan miste, deres mistillid til os ikke. Kan du følge det, altså det er et meget følsomt produkt ikke. Men det er også meget følsomt på den måde, at hvis der ikke er nogle tilhørende leverancer af software der egentlig understøtter alle de funktioner der er, så kan du jo også se den som nærmest kun halvt brugelig ikke." (Manager/Engineer)

That the focus was turned to GSM solutions instead of the broad palette of different projects utilizing RF technology pursued by ATL Research was quite naturally seen from one of the founders view. The GSM projects were relatively big, involved the fulltime attention of many employees, big costumers and lots of money. The other projects on the other hand, utilizing the RF competences in other fields, were relatively small, involved only the fulltime attention of one or two employees each, little money and difficult customers not familiar with the wireless technology. Therefore it was advantageous for the company to focus on the GSM tasks. So the first change in the TIDK time was a narrowing in the focus of the work area of the company to RF and the GSM system. Another change occurring in parallel was in the relations to suppliers and costumers.

In the ATL Research days the company had been working on different chip-sets produced by different players. This changed so that focus was exclusively on TI chipsets. This had implication for the costumers, according to the memory of one of the founders, one customer left because that customer wanted an Infineon chipset instead of a TI chipset. Around 5 employees also left TIDK after the acquisition because they disagreed with the decision to sell ATL Research to TI, and believed that a sale to Infineon would have been preferable. They therefore went to work for another local company in the NorCOM cluster called Danish Wireless Design, which was owned by Infineon. As mentioned earlier, the competence found in ATL Research in relation to RF solutions was relatively high in demand at that time.

This was a quite clear change, but in relation to suppliers, it wasn't the only. In the ATL Research days and early TIDK years was producing form factor designs for the end-user. Focus was to produce the best designs with exactly those components engineers in ATL Research and later TIDK found best suited for the task. Over time this changed to a focus on producing software development platforms for TI internally, and other issues came into focus to. These were a focus on TIs own components and a focus on a fast production time, i.e. TIDK had to be able to deliver a relative large batch of boards for software development relatively quickly after the chips was received. This meant amongst other that a new production department was set up in TIDK to help solve this demand. In the last years of TIDKs history focus was turned back from producing boards for software development to producing form factor designs for costumers. During this time the end-users had changed to. In the beginning it was relative small costumers in Asia who might produce 1 million phones of each design. In the end the costumers were some of the largest in the industry who might produce 100 million phones. This meant that the requirements for the designs also changed. One engineer explained:

"Engineer: ... you can get away with much more in relation to a Chinese customer than, well, it is sort of an 80 20 balancing. One would maybe not deliver the last 20% to a Chinese cus-

tomer, because one knows it is extremely expensive, and it just have to be sold on the Chinese market anyway, and the phone works and so. And then there can be some issues which [Name of Nordic handset producer] would never ever accept in it, because they have a bit different view upon things. They don't just want to sell a phone; they also look at how many there are return with errors and so.

Kristian Hegner Reinau: So it is simply a matter of quality or what

Engineer: Yes it is a matter of quality, but it is also a question about the scope of these companies being different. Well, you have a world organization, and you have some who just want to sell a few million phones in china. It is two slightly different scenarios."

"Engineer: ...man kan slippe af sted med mange flere ting overfor en kinesisk kunde end man kan. Altså det er sådan lidt en 80 20 afvejning. Man vil måske ikke ligge de sidste 20%, fordi man ved det koster utroligt meget, overfor en kinesisk kunde, og den skal alligevel bare sælges på et kinesisk marked, og telefonen virker og sådan noget. Og så kan der være nogle ting, som [Name of Scandinavian handset producer] aldrig nogen sinde ville acceptere i sådan en. Fordi at de har et lidt andet syn på tingene. De vil ikke bare sælge en telefon, de kikker også på hvor mange får vi tilbage igen i return rate med fejl på ikke også.

Kristian Hegner Reinau: Så det er simpelthen et spørgsmål om kvalitet eller hvad

Engineer: Ja det er et spørgsmål om kvalitet, men det er også et spørgsmål om at de firmaers scope er jo forskellige. Altså, du har en verdensorganisation, og du har nogle, som bare vil sælge nogle få millioner telefoner i Kina. Det er lidt to forskellige scenarier"

In the beginning TIDK had complete freedom to use exactly those components in their designs which they found best suited for the task. Let us take an example to illustrate, if an engineer had to design voltage regulator on 2,8 volt into a form factor design, then he was free to choose the regulator he believed was the best for the task. If TI did not produce such a voltage regulator, if he believed that the one offered by TI was too expensive compared to other suppliers or of inferior quality, then he was allowed to use a voltage regulator from another company. This freedom was secured in an agreement between TIDK and the vice president of the business unit within TI that bought ATL Research.

Over time, and this was a gradual transition through the three phases, as the business grew, this freedom was reduced because more and more strategic issues came into play. One issue was that the customers changed from relatively small Asiatic customers who might a few million phones of each design to bigger customers who might produce say 100 million phones of each design. Therefore, if a given component was needed, and TI did not produce it, then suddenly it was economically feasible to create such a component for the project because of the batch size. Another issue was that if TI one day had become adversary with another player in the industry on a higher level in the organization, then it was inappropriate if TIDK the next day gave this advisory an order for say 100 million components. Therefore more control from above was needed. This meant that over time the ability of engineers in TIDK working on reference designs to choose freely among components for these disappeared.

What was gained on the other hand was the ability to influence the creation of different chipsets and components. This was a clear change to over time according to one manager in TIDK. Engineers in ATL Research had to make use of the chips available on the market, and these were normally so mature, that when ATL got hands on them they were ready to go into mass production. This meant that ATL Research did not have an ability to influence the design of the chip. If an error in a chip was found by ATL Research, engineers would normally solve this on the board by adding the necessary components outside the chip. In the early TIDK years this situation was the same, but then things began changing gradually, so that in the last years the situation was as

follow: When the first roll of a TI chip was completed, and hence the first physical chips of a given kind produced, then these chips would be sent to TI sites in Nice, France, and Dallas, USA, and to TIDK. Nice and Dallas would then start probing the chip making tests on it, and TIDK would mount the chip onto boards as quickly as possible, and start conducting tests on some boards as well as sending other boards to Dallas for testing. If a second roll was needed, then the inputs from TIDK would go into the design, and so forth with later rolls. This meant that TIDK was involved in the design and testing of a chip on a far earlier stage than in the ATL Research days, where a chip could have been on the market say 2 years when ATL Research got in contact with it.

TIDK also received the possibility to influence the design of chips in another way. Some of the experts in TIDK were in the latter years involved in projects with chip designers in an organization of TI called Advanced Technologies in Dallas, which was working on new state of the art technologies unknown to people outside TI, which would hit the market around 5 years into the future, which in this industry is really long into the future. This also meant that TIDK was able to influence the development process in a much earlier stage than before. An example of this example is the a baseband chip where TIDK has been doing measurements and debugging on the chip in the development phase, so that TIDK has not developed the chip but has helped mature it.

From the viewpoint of TIDK, TIDK possessed this competence to influence the development of new chipsets because of the position of TIDK within TI with regard to the customers. One engineer explained this, quote:

"It is because we sit and build the hardware which looks the most like the stuff that ends in the phone out by the customers. And we support the customers with hardware design, and we help debugging some hardware problems and such. So I will say, that because we help building the phones, more or less, therefore we have a feeling of what is going on out in the real world. Whereas, if you sit and look at specification, and what is it called, well, what all the other do, our competitors with their chipset, well, what we see then is that they can do it all, or they offer all sorts of things. And when we then sit, or well, when we have some marketing people of bosses who sit high in the organization somewhere and plan it, well, this chip that are going on the market in say 3 or 4 years, something, it has to, well, of course it has to do it all. Because if they cut away something, and it turns out in 3 or 4 years, that this chip is not sold because it lacks these three things, well then it all falls back on the ones who made the original decision. And it is of course dangerous to make the wrong decision, but it is also dangerous to take too much functionality in. So it is a balancing act. And there we can contribute from here with something wish as far as I can see, not is working as it should. Well as it should, that I don't know, i would more say that it can become better, we can become even better" (Engineer)

"Det er så fordi vi sidder og bygger den hardware som ligner mest det der havner i telefonen ud til kunderne. Og vi supporterer også kunderne med noget hardware design, og er med til at debugge nogle hardware problemer og sådan noget. Så jeg vil sige fordi vi er med til at bygge telefonerne og sådan, mere eller mindre. Jamen så har vi en fornemmelse af hvad sker der egentlig ude i den virkelige verden. Hvor hvis du sidder og kikker specifikationer, og hvad hedder det, jamen hvad kan alle de andre, vores konkurrenter med deres chipset, jamen, det vi ser, det er jo at de kan det hele, eller tilbyder alle mulige ting, og når vi så sidder, eller hvad skal man sige, når vi har nogle marketingsfolk eller nogle chefer som sidder højt oppe et eller andet sted og planlægger det, jamen den her chip der skal på markedet, om 3, 4 år, et eller andet, hvad skal den kunne, jamen den skal selvfølgelig kunne det hele, for hvis nu de kommer til at skære noget væk, og så det viser sig om de her 3 4 år at den her chip den bliver ikke solgt fordi den mangler de her 3 ting, jamen så falder den jo tilbage på dem som tog den oprindelige beslutning. Og det er selvfølgelig farlig at tage den forkerte beslutning, men det er også farligt at tage for meget ind. Så det er en balancegang. Og der kan vi herfra i

hvert fald byde ind med noget, som jeg så vidt jeg kan se, ikke helt fungerer som det bør fungere. Eller som det bør fungere, det ved jeg ikke, jeg vil nærmere sige, det kan forbedres, vi kan blive endnu bedre" (Engineer)

To use a metaphor to describe this change in the creation of reference designs within TIDK one can use the metaphor of playing with Lego. If we see the components and chips as Lego blocks, then the engineer's task is to put these together on a board to form a reference design. In the ATL Research days the engineers had to look on the market to find Lego blocks, and the block available on the market determined which blocks they could play with. In the later TIDK years the engineers were able to influence the creation of new blocks in TI, and hence able to influence the design of the blocks available. In other words, now it was not just a matter of choosing among blocks on the market but instead of influencing the design of the blocks needed.

It is possible to describe the changes that have occurred over time in relation to RF technology, and hence part of the core competence of ATL Research and TIDK, using two dimensions: Integration and complexity. In the beginning a number of components were located externally on the board, and over time these were moved into the chip as part of an integration process. As this integration process has preceded the work needed to make a working radio has diminished. The following quote from an interview explains:

"...we know that the efforts we spend on RF will become less and less and less, so look at, when I started in this business we had easily for one radio development, and this was only GSM at that time, you had about 20 engineers on it. These days you do it just one or two, then you have maybe another 2 for validation methods, running the machines and see whether it is in spec or not. This comes with the higher integration level, today you have a radio, it has maybe about 20 components, when we started, we had about 220 components. So you can see the differences, it becomes easier and easier." (Manager)

This does not mean however, that it has become less work demanding to make a RF solution for a reference design for a mobile phone. The reason for this is that the number of radios within a phone has risen, and with this the complexity of the solution, quote:

"... [The fewer components needed in a radio] does not mean that we need less people to develop the product, why, because the complexity has increased at the same time. If you open today a mobile phone like this one [The interview respondent points to a phone on the table in front of him], I mean this one has already, not one radio, this has also Bluetooth in it, and the other one I have upstairs has GPS, WLAN, Bluetooth, GSM and if you want you can buy the same version in W-CDMA so you have 5 radios in it. Not counting the FM radio which will be the 6th one. So you can imagine that you still need RF but you don't need RF on GSM only. So you need to cover all flavors of different communications systems. So it would not be sufficient to develop in Denmark experts on GSM only. This is the consequence. Also having more, you see the mobile phones of the past they were maybe triple the size, these days they become smaller and have more radios but the frequency bands are still the same., so you get problems on the antennas, and the antennas are basically in the plastic, the size here, there are everywhere you see antennas, more communication systems, more antennas, you run into big problems to have the antennas placed and not interfering one system with another." (Manager)

So the challenge today is not to make one radio, with many components, but instead to make many radios with fewer components work together in a reference design without them interfering or blocking one another. This means that what we might call the engineering challenge for the engineers at TIDK has evolved through time. It also means that almost all errors have to be solved inside the chip. In the ATL Research days it was possible for the engineers to draw a system diagram and then start adjusting different things by adding or changing components here and there. The complexity and the fact that many functions are found inside the chip today mean

that TIDK engineers now have to be involved in the development of the chip. This process of TIDK getting involved in chip development has come so far, that one manager in TIDK said, that had TIDK not become involved in the chip development phase, then TIDK would not have a justification for existing within TI. Just making a reference design using a finished chip would demand nowhere near the staff TIDK employed in the last years.

The issue of increased complexity does not only relate to the RF area of the phone. Today the RF area, with its complexity, is just a small part of the complete mobile phone solution, and other areas have also become complex. To give an example, an engineer working in the audio area of the phone explained the difference between working in the audio area right after the acquisition and in the end of 2008, and the impacts upon the organization of the work:

".. it was very simple phones, where you can make a call, hang up, and send sms's and such simple things. And that means very simple software systems, where we today have large complex, what shall we say, both hardware issues, more speakers and microphones and external amplifiers, and then on the software side we have a giant software ghost, almost, it feels like sometimes, which we drag around which can do god knows how much. So this means, from being a small fast speedboat, where we could navigate and change course relatively fast, it has become a super tanker, so things have to be planned well in advance, and if we choose to change course, well, then we are stuck at that course the next couple of years (Engineer)

"...det var jo meget enkelte telefoner, hvor du kan ringe op og lægge på og sende sms'er og sådan nogle simple ting. Og dvs. meget simple software systemer, hvor vi i dag har store komplekse, hvad skal vi sige, både hardware mæssige ting, og, hvad skal man sige, flere højtalere og mikrofoner og eksterne forstærkere, og så på softwaresiden har vi jo et kæmpe stort software spørgsmål, næsten, føles det engang imellem som om, som vi slæber rundt med som kan gud ved hvor meget. Så det vil sige, det er blevet fra at være en lille hurtig speedbåd hvor vi kunne navigere og ændre kur rimeligt hurtigt, der sidder vi nu i en super tanker, så tingene skal planlægges god tid i forvejen, og vælger vi at skifte kurs, jamen så er det den vi hænger på de næste par år" (Engineer)

These competences within RF technology and GSM system knowledge was what TI acquired through ATL Research. In 2002, when Condat was acquired by TI, and TIDK thereby received around 35 new employees, the competences of TIDK expanded to include software competences within protocol stack development. A protocol stack is the software that produces the connection between the handset, i.e. the mobile phone, and the network, also called the backbone system. Due to the organizational structure and work tasks within TIDK and TI the software engineers from Condat and the hardware engineers from ATL Research did not have many working relations in their everyday work, so the synergies between the two groups were relatively small. One manager explains the events that cause the synergies to be few:

"I would have liked it to [HAD A CONSEQUENCE THAT CONDAT PEOPLE CAME INTO TIDK], it should have had. But unfortunately we never got it utilized in the way it should have been, because immediately, seen from the outside, then it was a big strengthening of the house that we suddenly had so many protocol stack people. Because to make a whole phone, and be a whole system house, then you have to have all the competences. And except layer 1, we had some protocol stack people who were former layer 2 people, but we were missing a little around layer 1 and DSP, but apart from that we had competences in largely all areas, when we got the Condat people. The problem was, that the part of the software organization we got in from Condat was working on 3G protocol stack, and the hardware people was predominately working on GSM, 3G is UMTS you know. And the way in which it was the idea it should have worked with Condat was, that they should do the 3G part in Aalborg and then the 2G part in Germany, because there they were already working on the pure 2G part. And then it should have been put together in a way so that we could have a dual mode protocol

stack. However, it ended with, because they simply not had the resources in Germany, those large parts of the 2G part was made in Aalborg too. But it was still for the dual mode phone, and by far the most of the hardware people in this house were working on pure GSM, and therefore the protocol stack coming from Berlin, and not the one which we made in this house. And therefore the synergy was really limited. In the first round we also made the mistake that we moved Condat into the house here, but they kept their organization and their management structure. It was something along the lines of the way ATL was acquired, and they wanted to let them be alone. But seen in retrospect, it was probably a mistake, to. It meant that I was the CEO for it all, I was development director for the whole hardware part, and had a director who was director for the software part, and then there was some people who were swimming in between, and that is the software people who are still here [WINTER 2007]. Because that was the old ATL software people, but should they be appointed to the new software organization or what should they, so they were swimming there in between. And then we had Finn Andersen, who was the CEO of both parts, but he was not, what is it called, so much operational development director in that way. I think later we changed it, so that I became the development director for the whole thing and then I had a hardware director and a software director below me. But I think that it was a mistake that we did not do it like that from the start. Further it is of course also a mistake that we had, it was here the battle with San Diego comes into the picture and some adverse events in TIs roadmap. Because had we just got it stated, or, some things happened when I had, well, it actually stated before I took over management of the software part. We finally succeeded in establishing that we should make the reference design for these dual mode phones also. So we started making a reference design for such a UMTS GSM dual mode phone. And in this we obviously had a close corporation with the software people. And this was starting to move in the right direction. But I had almost said, that we had hardly stated before it said boom, and then TI decided that this chipset would not be finished at a time in which it was competitive on the market. So we was going to change the roadmap. So they stopped the development of the chipset, and with this we obviously also stopped the development of the hardware platform. We supported it, because the software people obviously had to have something to work on, but, so the corporation that was starting to show because we finally had a common interest, that stopped, and there was no new reference design immediately, because they had to start from scratch with the chipset, so there was a long big hole. And we first got it started again in relation to a decision that on of the 2G, or 2,75G, EDGE phone, had to use the GSM part of the protocol stack we were producing here in this house. Then we got it started again. And things began moving in the right direction again, and we started to reach a state where we could sense that synergy was emerging. Then they decided to move all protocol stack development to Mexico. So the fact that we got more competence because we got all these protocol stack people in, that we have unfortunately never gotten full reward for. It, every time it has started to work, then it has been stopped again due to external circumstances. Of course we have gotten something from it because it has been possible to go and ask, there are many of them who has had a huge system knowledge, also because most of them was former GSM development people. So there were many people we could draw on. But the fact that it was not a daily corporation meant that we it was like having two, sometimes three firms within the firm here, which we had to try and melt together, and that process became very long because of these external circumstances that kept putting obstacles in our way (Manager)

"Det vil jeg meget gerne have haft [at det betød noget at få Condats kompetencer ind i TIDK], at det skulle have gjort. Men desværre så fik vi det aldrig udnyttet på den måde som det egentlig skulle have været, fordi, umiddelbart, set sådan helt udefra, så var det jo en stor styrkelse af huset, at vi pludselig havde så mange protokol stak folk. Fordi for at kunne lave en hel telefon og være et helt system hus, så skal man jo have alle kompetencerne. Og på nær lige lag 1, vi havde nogle protokolstak folk der var tidligere lag 1 folk, men vi manglede lidt omkring lag 1 og DSP, men ellers så havde vi stort set kompetencer indenfor alle områder, da vi fik condats ind der. Problematikken bestod i, at den del af software organisationen vi fik ind fra Condat, de arbejdede på 3G protokol stak, og hardware folkene arbejde fortrinsvist GSM, altså 3G det er UMTS ikke. Og meningen, måden det var meningen det skulle have kørt på, med condats var, at de skulle have lavet 3G delen i Aalborg og så 2G delen i Tyskland, fordi der

arbejdede de i forvejen på den rene 2G del. Og så skulle det så kunne sættes sammen sådan at man kunne have en dual mode protocol stak. Det endte så med pga. at de simpelthen ikke havde ressourcer i tyskland, at store dele af 2G delen også blev lavet i Aalborg. Men det var stadigvæk til dual mode telefonen og langt de fleste af hardware folkene her i huset, de arbejdede med rent GSM, og dermed med den protokol stak der kom fra Berlin, og ikke med den vi lavede her internt i huset. Og derfor så var synergien stærkt begrænset. I første omgang der lavede man så også den fejl sådan set, at man flyttede godt nok condat ind i huset her, men de beholdte deres organisation og deres management struktur. Det var sådan lidt i stil med den måde man havde købt ATL og så ville gerne lade dem være alene, men set i bakspejlet, så var det nok en fejl, at, så det betød så at jeg var sådan set chef for hele, jeg var udviklingschef for hele hardware delen, også havde de en direktør der var direktør for software delen, og så var der i øvrigt nogle der svømmede lidt midt imellem, det er de softwarefolk vi har her endnu, fordi det var jo gamle ATL softwarefolk sådan set, men skulle de nu tilknyttes den store software organisation eller hvad skulle de, så de svømmede lidt der midt imellem, og så havde vi så Finn Andersen der så godt nok var chef for begge dele, men han var jo ikke, hvad hedder det, så meget operationel udviklingschef på den måde. Jeg tror, senere hen så lavede vi så om så jeg blev udviklingschef for det hele, og så havde jeg så en hardware direktør og en software direktør under mig. Men jeg tror at det var en fejl at vi ikke gjorde det sådan fra starten af. Derudover så er altså også selvfølgelig en fejl at vi havde, det var så her at kampen med San Diego kommer ind, og desuden nogle uheldigheder i Tis roadmap. Fordi hvis bare vi havde fået startede, eller der skete nogle gode ting da jeg havde, ja det startede faktisk inden jeg overtog ledelsen også af softwaredelen, der lykkedes det os så endelig at få slået fast at vi skulle altså lave reference design for de her dual mode telefoner også. Så vi gik i gang med at lave et referencedesign til sådan en UMTS GSM dual mode telefon. Og der havde vi selvfølgelig et tæt samarbejde med softwarefolkene. Og tingene begyndte så at gå i den rigtige retning. Men jeg havde nær sagt, at vi var næsten ikke kommet i gang før at det sagde bom, og så besluttede TI sig for at det her chipset det når ikke at blive færdig til et tidspunkt hvor det er konkurrencedygtigt på markedet. Så vi bliver nødt til at ændre roadmappen. Så man stoppede udviklingen af chipsettet, og dermed så stoppede vi selvfølgelig også udviklingen af hardwareplatformen. Vi supporterede den, for softwarefolkenen skulle selvfølgelig have noget at arbejde på, men, så det samarbejde der endelig var begyndt at komme i gang fordi at vi endelig havde en fælles interesse, det stoppede, og der var ikke noget nyt reference design lige umiddelbart fordi men skulle simpelthen starte helt forfra med chipsettet, og der blev et langt stort hul, og så fik vi det først startet igen i forbindelse med at man bestemte sig for at en af 2 G, eller 2,75G, EDGE telefonen, så rent faktisk skulle bruge GSM delen af den protokol stak vi lavede her i huset. Så fik vi så noget gang i det igen. Og tingene begyndte så igen at køre i den rigtige retning, og var sådan igen ved at nå et stade hvor vi kunne mærke at der var ved at begynde at komme lidt synergi. Så besluttede man sig så for at flytte alt protokolstak udviklingen til Mexico. Så det der med at vi fik mere kompetence ved at få flyttet de protokolstak folk ind, det har vi desværre aldrig fået fuld valuta for pengene. Det, hver gang det har begyndt at kunne begynde at virke, så er det af ydre årsager blevet stoppet igen. Selvfølgelig har vi fået noget ud af det for der har været mulighed for at gå over og spørge, der er mange af dem som har haft meget meget stort system kendskab, også pga. de fleste af dem var gamle GSM udviklings folk. Så der var mange folk man kunne trække på. Men det at der ikke var et dagligt samarbejde det gjorde jo at det var ligesom at vi havde to, nogle gange ligesom 3 virksomheder i virksomheden her, som man skulle forsøge at få til at smelte sammen, og den proces blev altså meget lang pga. de her ydre omstændigheder, der blev ved med at komme og spænde ben for os." (Manager)

With the reorganization in 2007 the protocol stack software work within TIDK was moved to a TI site in Mexico¹¹, as stated in the quote above. The reason for this was two things according to a manager; mainly a TI strategy to centralize software development with focus in USA, secondarily a focus on minimizing expenditures within TI globally. The day it was announced that TI decided that chipset described in the quote above would not be finished at a time in which it was

¹¹ Of the 58 protocol stack engineers that was fired 8 got new jobs with IT in Dallas, USA..

competitive on the market and therefore closed the project, is the day described in the section "And afternoon in May"

There had been little synergies between the groups but nevertheless the change influenced the software engineers still employed in TIDK after the change, working in Tools or Solution Delivery, two departments within TIDK is shall return to later. One of these explained in relation to what he saw as the most important changes within TIDK quote:

"Well, the most important have been, for one thing, if we go back starting from where we are now, then we go back a year where we had a large software department with 60 people. That was obviously very self-propelled, we could talk software with people in there. My background is in software, so I can talk with, now I actually not have many other than myself to talk with anymore. There are not so many software people in this company anymore." (Engineer)

"Altså de vigtigste har jo været, dels, vi går tilbage her, starter hvor vi er nu, så går vi et år tilbage hvor vi var en stor softwareafdeling, på 60 mænd. Det var selvfølgelig meget mere selv-kørende, vi kunne snakke software med folk derinde. Jeg er selv software mand af baggrund, så jeg kan godt snakke med, nu har jeg faktisk ikke ret mange andre end mig selv om snakke med. Der er ikke så mange softwarefolk her i firmaet længere." (Engineer)

That TIDK produces boards that are complex due to the amount of radios on them and that TIDK therefore need to be involved in chip development mean that the engineers working at TIDK need to have more relations with other sites within TI than before. This is because as the technology and the customer have changed from many small to fewer large customers, so have the work tasks conducted for these customers:

"Engineer: It has changed from having small customers, many small customers, Chinese customers, who each want to make their own version of a phone, to only having five left, five big customers. So it is the same amount of this that are sold, if not more, but one can see that, well from having to support a lot of small customers in which there still is volume, and there was a good business in the start, and that was what the company ATL was really good at. But now it is the big ones we are in and support instead.

Kristian Hegner Reinau: "That change, has that had any, or do it reflect in the way in which the work is done, in who you work with, who you work with in everyday life.

Manager: Yes it does, because you get more global contacts, one can say. Off course we still had global contacts earlier, but well, when you move up into the food chain, then there becomes more, knowledge become more specialized, so you are more dependent upon, well, you cannot count on it being in the site, so you become dependent on knowledge different places"

"Engineer: Det har ændret sig fra at man har små kunder, mange små kunder, kinesiske kunder, der gerne vil lave hver deres version af en telefon, til at der kun er 5 tilbage, 5 store. Så det er det samme antal chips der bliver solgt, hvis ikke flere, men man kan jo se, altså fra at skulle supportere en masse små som der stadigvæk var volumen i, det var der en god forretning i i starten, og det var det firmaet ATL var rigtig god til. Men nu er det så de store vi er inde og supportere i stedet for.

Kristian Hegner Reinau: Det skift der, har det haft nogen, eller afspejler det sig i den måde hvorpå arbejdet foregår, på hvem i arbejder sammen med, du arbejder sammen med i dagligdagen.

Engineer: Ja det gør jo at du får flere globale kontakter, kan man sige. Selvfølgelig har vi stadig globale kontakt tidligere, men altså, når man rykker op i fødekæden, så bliver der jo også flere, bliver viden mere specialiseret, og så er du jo mere afhængig af. Altså så kan du ikke regne med at det er på site, så bliver du mere afhængig af viden rundt omkring." (Enginner)

They have hence also become more involved in political games than before which we shall return to later. To understand the development of TIDK through the three phases we need to understand not only the changes in technology that have occurred, but also the changes that have occurred in the market for these technologies. This will therefore be the focus of the next section.

4 The market

During the time from the acquisition in 1999 to the fall of 2008 the market in which TI, and hence TIDK, has operated has changed. The 2G, 2,5G and 2,75G has matured and focus in the competition is now on cost and time-to-market in this segment of the wireless communications market, as a manager explained, quote:

"... you can say that 2G and 2,5G, and EDGE for that matter, have become mature products. After this has happened, this has happened over this period that they have become mature products more or less, that means that one to a far higher degree is under an economical pressure on the products than you are in the starting phases, so to say." (Manager)

"...du kan sige at 2 g og 2,5 g, og EDGE for den sags skyld, er blevet modne produkter. Efter at det er sket, det er jo sket over den her periode, at det er blevet mature produkter mere eller mindre, det har jo bevirket at man så i langt højere grad er under pres økonomisk på produkterne ikke, end man er i de indledende faser kan man sige." (Manager)

TIDK has been working on high-end phones and 3G phones, but in the last years the company was focusing only on 2G, 2,5G and 2,75G low to mid end phones. This was seen by an engineer in September 2008 as a shame, because he thought it could have been interesting to work on higher level phones, quote:

"Well, it was some of them [MIDT TO HIGHEND PHONES] which I personally think it could have been exciting to work with, but they are located in Dallas. There a lot, well, in recent time many tasks have been moved to Dallas in that direction, so in reality it is only the lowest and second lowest which are located here. All the other segments are located in Dallas." (Engineer)

"... Altså det var da nogle af dem [MIDT TO HIGHEND PHONES] som jeg personligt synes var meget spændende at være inde over, men de ligger i Dallas. Der ligger noget meget, altså der, i den seneste tid er der trukket mange opgaver til Dallas på den måde, så det reelt set er kun det laveste og næstlaveste det ligger her. Alle andre segmenter ligger i Dallas."

The changing market was showing already at the time of the acquisition, where the demands to the company were rising, as the following quote from a manager interview show:

"ATL was acquired in 99, and at that time a number of firms existed with the size of ATL Research before the bubble burst. It was small companies with maybe around 30 employees, and ATL had there focal point in producing an RF which were stable. It was a deliverance of a platform. But what happens around 99 is that this GSM market, this is extreme dynamic and sensitive, and the competition simply becomes too hard. You know, sitting in Aalborg and supporting Asiatic customers, right. Well, just the argument to say, I remember that I meet a [NAME OF BIG ASIATIC HANDSET PRODUCER] manager who said, can you tell me one good reason why I should fly my team to Aalborg. Why don't you come to Korea, and sit and work with me 24 hours a day" (Manager)

"ATL blev opkøbt i 99, på det tidspunkt eksisterer der en del firmaer på den størrelse som ATL research havde lige før it boblen sprang. Det var små virksomheder med måske 30 mænd ansat, hvor ATL havde deres omdrejningspunkt det var at lave en RF som var stabil. Det var en delleverance af en platform. Men lige omkring 99 sker der det, at her GSM markedet det er jo ekstremt dynamisk og følsomt, og ekstremt eksplosivt også ikke, at konkurrencen

simpelthen bliver for hård. Dvs. for at skulle sidde i lille aalborg og servicere asiatiske kunder ikke. Altså bare det argument og sige, jeg kan huske jeg mødte en [NAME OF ASIATIC HANDSET PRODUCER] manager der sagde, kan du fortælle mig én grund til at jeg skal flyve mit team til Aalborg. Hvorfor kommer du ikke ud til Korea og sidder og arbejder sammen med mig 24 timer i døgnet." (Manager)

This development has continued since. A manager described the pressure on TI and TIDK in 2008 in the following way, quote:

"In the start, in the late 90s, right, there it could very well take 2 years to make a phone. Today it takes 3 months before it rolls out on the belt. A whole new variant, right. So the time aspect in making a phone has maybe been reduced by a factor 7 through the last 10 years, and the stress factor in making a wireless product, right. But the phone is still, it has become a bit more complicated you can say. There has come, well, larger demands for the user interface, quality of the display, quality of the audio, gaming, well, you have to be able to do more to sell. And that's not enough, it has to look cool too. You know, it has to maybe be really flat or it has to have some ID which is different from the other phones, and that's where the battle is. Because today GSM is a hopelessly outdated technology. That is not where you win. There you have to get to 3G telephony and so on. So just look at that aspect in the giant giant, well, to follow the process from where you sit and think you are the world champion in RF, that has just become a small decimal point in delivering, what shall one say, in the beginning of the food chain. Well, being the one, what should one say, the one which the handset producers choose, right." (Manager)

"I starten der i sen 90'erne, ikke, der kunne det godt tage 2 år at lave en telefon. I dag der tager det 3 måneder, før den ruller ud på båndet. Altså en helt ny variant ikke. Så tidsaspektet, og den stress faktor der er i at lave et wireless produkt, ikke, den er måske blevet reduceret med en faktor 7 på de 10 år. Men telefonen er jo stadigvæk, den er jo belevent lidt mere kompliceret, kan man sige. Der er kommet, altså der er større krav til user interfacet, kvaliteten af displayet, kvaliteten af audioen, spil, gaming, altså du skal kunne mere for at kunne sælge dig. Og ikke nok med det, den skal også være ret cool at se på. Altså den skal måske være meget flad eller den skal have en eller anden ID som adskiller sig fra de andre, og det er der kampen den ligger. Fordi GSM telefonen det er håbløst forældet teknologi i dag. Det er ikke der du vinder. Altså, så skal du jo over i 3G telefoni osv. Så bare se det aspekt i den kæmpe kæmpe, at følge den proces der fra at man sidder og tror man er verdensmester i at lave RF, det er bare blevet et lille komma i at levere, hvad skal man sige, i at være forrest i fødekæden. Altså være den som, hvad skal man sige, være den som telefonproducenterne vælger som løsning, ikke." (Manager/Engineer)

This mean that the core competence which TI acquired in ATL, the RF competence and GSM system knowledge, are still important for TI, but they are just a small part of the complete solution today. A manager explains:

"The core competence which was found in ATL, that we still have. But it has become a small area, an important area, of what we do, right. Well, the RF, that is something which has to work if you and to send anything. But where the challenge is now is to make the system work with the software now, and all the baseband processes. Actually I would state the claim, and maybe some would challenge on this, it is what you see and feel on a phone. This means, that if you came and say that that phone has a bad standby time. This it means that maybe we have not made, optimized our system, this means the hardware and software, for an optimal power consumption. Do you follow me. And that is much more complex than to sit and make a radio which just has to send and receive some data. A completely different aspect is the cost, it has to be so extreme cheap as possible, right. The cost is so important a factor that you are forced to make compromises with some of the performance. (Manager)

Den kernekompetence som var i ATL, den har vi stadigvæk. Men den er bare blevet til et lille område, et vigtigt område, at det vi laver her ikke. Altså RF'en, det er noget der skal virke for

at du kan sende. Men der hvor udfordringerne ligger det er jo netop at få systemet til at virke sammen med software nu og sammen med hele baseband processerne. Faktisk vil jeg våge den påstand, og det er der måske nogle der vil udfordre mig på, det er hvad du kan føle og se på en telefon. Dvs. hvis du kommer og siger den der telefon den har en ringe standby tid. Så betyder det vi måske ikke har lavet, optimeret vores system, dvs. softwaren, og hardwaren, til at have en optimal power consumption. Kan du følge det. Og det er meget mere komplekst end at sidde og lave en radio som bare skal sende og modtage noget data. Et andet aspekt er hele costen, altså det skal jo være så sidsygt billigt som overhovedet muligt, ikke. Cost'en er så vigtig en faktor at du er tvungen til at gå på kompromis med noget af performancen.”

(Manager)

This quote contains three important points, firstly that the RF and GSM competences are still important, because they have to work. Secondly, other things at the system level are more important in relation to the competition with other player in the industry, and this competence is to a large extent not located exclusively in TIDK but dispersed among different TI sites. Thirdly, due to cost issues, it is necessary to make compromises in respect to performance. This last point is especially important, because, as we will return to later, the last years some engineers in TIDK was unsatisfied with the fact that they constantly was under pressure to be effective and felt that it compromised the technical quality of their work. That cost issues has become important for TIDK, and sometimes mean that it is necessary for TI to set the technical level of their solutions thereafter is an important point, which I shall return to later.

Today companies like TI are competing on the three factors: the system, understood as the characteristics of the system, cost and time-to-market. Especially the focus on cost has put pressure on TIDK, quote:

”Cetelco, which you have probably heard about, right, was trendsetter at that time. They for example produced the first mobile with integrated antenna, which were delivered to Ferrari or Porsche and so on, so it was really state of the art at that time, and represented brilliant electronics. Well, before it got commercial, right. And that was what happened, the dynamics that occurred was that there emerged an need for a company with only the RF competence at that time. So you can see the whole dynamics there, but today, right, today it is the system, it is the cost, it is time-to-market. That is the three parameters you have to master. Delivery of highly complex systems, keeping the price down, though the whole chain, both in relation to cost seen from the customer and in relation to your own R&D cost. And there I will claim, that is my claim, that there we are under high pressure in Denmark. Because, if you look at a lot of the software people coming in now, they are from Eastern Europe, because they work for a third of the price of a Danish engineer. Maybe that is nothing new, but it is also a factor right. (Manager)

”Cetelco, som du har hørt om ikke også, som jo også var trendsætter på det tidspunkt ikke, der blev jo blandt andet lavet den første mobiltelefon med integreret antenne ikke, og den blev leveret til Ferrari eller porsche osv, jamen det var virkelig state of the art på det tidspunkt ikke også, det repræsenterede elektronikken på det fornemste kan man sige, ikke. Altså før det blev kommercielt ikke. Og det var jo det der skete, den dynamik der skete var jo så at der blev behov for et nyt firma som kan bare RF kompetencen på det tidspunkt. Så du kan jo se hele den dynamik der ikke, men i dag, ikke, altså der er det systemet, det er costen, og det er time-to-market, det er de tre parametre man skal kunne mestre. Højkompleks systemlevering, holde prisen, omkostninger nede i hele kæden, ikke, altså både det hvad det koster for kunden og købe det men også dine egne RD omkostninger skal være lave ikke. Der vil jeg så påstå, det er nok min påstand, men der er vi jo meget under press i Danmark, ikke. Fordi, også hvis du ser mange af de softwarefolk der kommer ind nu, de kommer jo fra østeuropa fordi de går til en tredjedel af prisen hvad en dansk ingeniør gør, ikke. Det er der måske ikke så meget nyt i, men det er også en faktor ikke” (Manager)

During the last of TIDK history the focus on cost was further increased. This was due to several things. One issue was to hardening competition on the market. In 2008 TI went from being the sole supplier of UMTS (3G) and EDGE (2,75G) chips to Nokia, to being one of four suppliers¹². Further, the global financial crises by the end of 2008 also influenced the economy of TI. As one manager explains:

"Manager: ... We [TIDK] have also been less focused on cost than we have been the last year and a half. Well, if I take from 2003 until the start of 2007, there we were not so focused upon cost, we have spent a lot of money, right.

Kristian Hegner Reinau: What caused that to change around 2007

Manager: Well, it was a lot of things. The competition has become harder. We are also, suddenly we were not the only supplier to [NAME OF HANDSET PRODUCER] anymore, which was really a force in cutting, the focus on cost here, you know. And now it is also enhanced by the latest development on the market

Kristian Hegner Reinau: The financial crises.

Manager: Yes."

"Manager:Vi [TIDK] har også været mindre cost fikserede end vi har været det seneste halvandet år her. Altså hvis jeg tager fra 2003 og frem til starten af 2007, der var vi ikke så kostfikserede, vi har brugt mange penge ikke også, og, så.

Kristian Hegner Reinau: Hvad fik det til at ændre sig der omkring 2007

Manager: jamen, altså der var mange ting. Konkurrencen er blevet hårdere, vi er jo også, lige pludselig blev vi jo ikke ene leverandører til f.eks. [Name of handset producer] længere vel, hvilket jo var specielt med til at skære, costfokus, her hos os ikke. Og nu er det jo så yderligere forstærket af den seneste udvikling på markedet

Kristian Hegner Reinau: Finanskrise

Manager: Ja"

To sum up, the market has changed so that today, compared to the time of the acquisition of ATL Research, competition is much fiercer on the market, the GSM (2G), GPRS (2,5G) and EDGE (2,75G) solutions has matured, and cost has hence become an important variable in the competition. It is now time to focus on the changes experienced by TIDK after the acquisition.

5 Changes in management practices and organization

This section is going to focus on how the management practices and the organizational structure within TIDK changed through time. To understand the situation of TIDK in the early years after the acquisition, we have to understand, that TI at the time being had brought a number of small companies around the world. TI tried in these years, to make sure, that the transition following the acquisitions, where the companies went from being a company on their own to being parts of TI came slowly, so that the employees of these companies would not leave them, and TI thereby loose the acquired competences embodied in these employees. One of the managers in TIDK tells, quote:

"What happens gradually over the first years is that we become more and more TI-"ed", if one may say so, so they [TI] roll out more and more, or demand that we obey more and more

¹² Source: Financial Times (www.ft.com 2008)

TI-policies because of two reasons. The first reason is that TI was actually quite good there in the end of the 90's to buy in companies and then make sure that they [the employees] would not run away screaming immediately, by having such a gradual transition. This was the one thing, and therefore we got some years to get used to the idea that things should be done in a certain way. The other thing was also, that we were a rather small department until we were around the end of 2002, a small block within TI, but then with the Condat people that entered the company there and other things, then we came up around 100 employees, so suddenly we became a economically influential part of the Wireless Business Unit. This also gave us some rules, some more rules, which we should comply with. And it is then, well it is not black or white, but the fact that we became larger meant that there came more and more focus on the rules, and it is specifically from finance they monitor very carefully whether we comply with all TI's official policies."

In the early years of TIDK the three founders of ATL constituted the management in TIDK, one became managing director, and the other two became project leaders, which meant that they were managing work on the ongoing projects. The organization was relatively flat, there were only the project leaders and the engineers working on the projects, and hence no line functions in between. This would change with the infusion of people from Condat and Telital, as we shall return to later. Let us here dwell a bit more with the situation in the early years.

Managers and employees saw the acquisition as something positive. Firstly, during the ATL Research days employees had gotten shares in ATL research. This meant that not only the founders of ATL Research but also some of the employees earned quite a lot of money from the acquisition. The employees that had been among the first employed in ATL Research made around 100.000 Danish kroner each from the sale. Secondly the company became part of a multinational company in a field where there were a large profit to be made at the time. This meant that after the acquisition it was possible for the management to pay the engineers better than before and utilize better bonus arrangements. TI at the time had a profit-sharing policy, and this coupled with the large profit to be made in the mobile communications market at the time resulted in quite large profit-sharing payments to the engineers. To give an example, the year 2000 was a successful year for TI and therefore each employee in TIDK got a pay out of 25% of his or her yearly salary in February of 2001. Such bonuses, if we call it this, had not been possible in the ATL Research time given the size and profit of the company there. That management continued pretty much like in the ATL research year and that the engineers received relatively large bonuses resulted in a view among the engineers upon the acquisition as something positive. It was happy days for the employees where they could earn a lot of money personally.

What were changed with the acquisition was some of the management practices within the management of TIDK. The ability of the management in TIDK to decide everything themselves disappeared. TIDK had to find its place within the TI organization and people in TIDK had to learn the practices within that organization. One engineer explained about the early years, quote:

"Well, there the firm has to establish itself. Well, inside the organization anyway. It might have been acquired and everything, but it takes time to establish it. And one has to have something, oh yes, it is them who is doing that. This thing was what the first years went with, and it happened here a lot." (Engineer)

"Jamen der skulle firmaet jo etablere sig. Altså i hvert fald indenfor organisationen. Det kan godt være at det var købt og det hele, men det tager lang tid at etablere sig. Og man skal lige-som have et eller andet, nå ja, det er dem der står for det. De ting, det var det de første år gik med, og det foregik meget her." (Engineer)

5.1 TI management practice

The changed practices became clear when the situation became less golden than it had been in the first years after the acquisition. One manager recalls that he had mixed feelings about the 25% bonus in 2001, quote:

“... one could well see exactly there in February of 200, or maybe it was in February of 2001, yes it was the 2000 balance sheet which was so extremely good. Yes, so in February of 2001 we are given this huge huge bonus. But there one could well see that things were going downhill fast. So in that way, well, when you sit as a wage earner then you obviously think that it is good, you get a lot of money. But as having been used to running your own company, then it was actually completely crazy, because you could see that things were going downhill, and then you should not pay such a large bonus. But anyway, now the rules were like that. We would not have thought of making a surplus sharing that worked that way. So yes, yes there happened a lot of different. Then the year after nothing was given, because then the rules were changed, but that gives big troubles for a company like TI. We actually had to change the way in which we calculated how much one should pay in surplus sharing, because people they had, suddenly they became used to, during three or four years, some pretty good payments in surplus sharing because it had been good years, right. So people had gotten used to it and then you cannot suddenly stop, just because the times become bad, and the calculations showed that suddenly you should not have anything. Well, then there was a terrible whining because of that, so we actually had to change the calculations so that it became easier to gain permission to pay surplus sharing. But that is something which you can juggle around with in a big firm like this, and that we [ATL RESEARCH] would not have had the possibility to do.” (Manager)

“...man kunne jo godt se der netop i februar 2000, eller det har måske været februar 2001, ja det har været 2000 regskabet som var så vældigt godt ja, så februar 2001 der får vi udbetalt sådan en vældig vældig stor bonus, men der kunne man godt se at tingene de var altså hastigt på vej ned af bakken. På den måde var det sådan set en stor, altså når man sidder som lønmodtager så synes man selvfølgelig det er fint nok, man får en masse penge. Men som værende, have været vant til at drive sin egen virksomhed, så var det faktisk hul i hovedet, fordi man kunne se tingene de var på vej ned af bakken, og så skal man ikke udbetale så stor en bonus. Men altså, nu var reglerne jo altså ligesom sådan at. Vi kunne ikke have fundet på at have lavet en overskudsdeling der fungerede på den måde. Så jo jo, der skete så mange forskelle. Så året efter så blev der ikke udbetalt noget, fordi at så var reglerne jo. Men det giver store problemer også for sådan en virksomhed som TI. Vi blev faktisk nød til at ændre så på måden hvor vi beregnede hvor meget man skal udbetale i overskudsdeling, fordi at folk de havde været, de var pludselig blevet vennet til, i løbet af en tre fire år, sådan rimeligt gode udbetalinger i overskudsdeling fordi at det havde gået godt ikke, så havde folk ligesom vennet sig til det, og så kan man ikke pludselig stoppe, så bare fordi det blev dårlige tider, og derfor sagde beregningen lige pludselig at du skal ikke have noget, jamen, så var der en værre hylen over det, så vi blev faktisk nød til at ændre på formen således at det blev nemmere at få lov til at udbetale noget overskudsdeling. Men det er jo sådan noget som man så kan jonglere rundt med i en stor virksomhed, og det vil vi ikke have haft mulighed for.” (manager)

The managers in TIDK was able to pay a higher salary and better bonuses for the employees than when they were ATL Research. During the whole lifespan of TIDK the employees have been among the best paid engineers, if not the best paid, in the NorCOM cluster. But the procedure for setting the wage became more complex, which also exemplifies a change in management practices. A manager explains how the practice for setting wages was in the time 2003 to 2008:

“Manager: ... I have always been, and still is, the one who sets wage and bonus in this house. It is obvious that, if one say, the way, I mean, it might be that they feel that it has been like that [THAT WAGE AND BONUS IS SET OUTSIDE TIDK]. The way it works is, what you do in TI, and you do this all the way round, is, that once a year, then I make a report for Denmark

about how I expect the wage development to be, how the surrounding world look like, why I believe this to be the case, show some inflation numbers, some different numbers, GNP and such,

Kristian Hegner Reinau: So the wage development in Denmark

Manager: Yes, and then we meet in a worldwide compensation team, in September. There everyone present the report on their country. And then afterwards our worldwide compensation people go home and process the issue further, and gets it approved by the highest president, when they have put it all together, looked at it and investigated the consequences for TI as a whole if we now let the wage development in Denmark slide with 3,5% and in Germany with 2,5% and so. And then they come back and say Ok, or they could say, which has happened one or two years, where they come back and say that for the whole of Europe, you have to lower your increase with 0,5%, for example to cut down expenses, or something, right. That is the way it works. And then on that background, so when we have that approval, I have said that I want the wage in Denmark to increase with 3% next year, and I have gotten go for it, then it is a process where we on every person puts, where managers in this house, or all supervisors, put an increase on their people. What the supervisors here have been told is that they have to stay within, as a whole, the 3% I have given.

Kristian Hegner Reinau: Ok, so that mean that some can get more and some less.

Manager: Yes yes, so some get 10%, other get 0, and so forth. So that the way it runs. But it is people in this house that does it by themselves."

"Manager: ... Jeg har altid, og fortsat, været den der har sat løn og bonus her i huset. Det er klart at det er, hvis man nu siger, den måde som, altså det kan godt være at de føler det har været på den måde, men det. Den måde det hænger sammen på det er, hvad man gør ved TI, og det gør man hele vejen rundt, det er, at man en gang om året så mødes, så laver jeg for Danmark en rapport omkring hvordan forventer jeg at lønudviklingen den vil gå, hvordan ser omverdenen ud, og hvorfor tror jeg på det, viser nogle inflationstal, viser nogle forskellige tal, BNP og alle sådan nogle ting,

Kristian Hegner Reinau: Altså lønudvikling i Danmark

Manager: Ja, og så mødes vi i et world wide compensation team, i september, og der fremlægger man så hver især sin rapport for sit land. Og så efterfølgende så tager vores worldwide compensation folk, de tager så det her med hjem, behandler det yderligere, og får det så endelig godkendt af øverste præsident ikke, når nu de har samlet det hele, og så kikket på hvad betyder det så, hvilke konsekvenser har et for total TI hvis nu vi lader lønudviklingen i Danmark glide med 3,5% og i tyskland med 2,5% og i, sådan, ikke. Og så vender de tilbage og så siger de ok, eller de kunne måske sige, hvilket er sket, et eller to år, hvor de vender tilbage og siger for hele Europa der skal i sænke jeres stigning med 0,5%, f.eks. for, af sparremæssige hensyn, eller hvad det nu måtte være, ikke. Det er sådan det foregår. Og så på baggrund af det, så når nu vi har den der godkendelse på, hvis nu jeg har sagt at jeg vil have lønnen til at stige i Danmark med 3% næste år, så, og jeg har fået go for det, så er der en proces for det, hvor vi på hver enkelt person går ind og lægger, hvor managerne her i huset, eller alle supervisors, ligger lønstigningerne ind, på deres folk. Det de har fået kommunikeret supervisorerne her, det er at de skal holde sig samlet indenfor de her 3% som jeg har givet

Kristian Hegner Reinau: Ok, så det vil sige nogle kan få mere og nogle kan få mindre

Manager: Ja ja, så er der nogle der får 10% og nogle der får 0, og så fremdeles. Så sådan kører det. Men det er folk her i huset der selv gør det."

It should here be mentioned, that the presence of other multinational companies in North Jutland was also used in this negotiation process, as I shall return to in section 9. To give another example of one of the changes in management practice we can focus on the process regarding

employment of new people in the company. One of the ATL Research founders tells the following about the sale of ATL Research to TI, regarding the options of hiring people:

“As soon as we had signed the deal, there was a couple of ladies and the vice president from Dallas here to sign it, and we were sitting in our local office, then we were told, that now we had to remember that we could not just do what we felt like relation to such things. Well, they said it with a smile, but it was to make sure that we would not get into problems” (Founder ATL)

In ATL Research managers decided themselves when to hire people. When ATL Research got big projects, and manpower was needed, then new staff was recruited for the task, as one manager in TIDK recalls from his time in ATL Research:

“In ATL it was clearly the way, even if though it was a newly started firm, that they said, if we have too much to do in a longer period, then we have to have an extra man. So they scaled their staff after what they had to do” (Manager)

“I ATL var det helt klart sådan, selv om det var et nystartet firma, at man sagde, hvis vi har for meget at lave i en længere periode, så skal vi have en mand mere. Så man skalerede sin bemanning efter hvad man havde at lave.” (Manager)

In TIDK the process of hiring new staff is more complex, and contractors have been increasingly used over time as a consequence of this, as a manager in TIDK explains:

“What you can say there is restrictions on, but that is because we are an American corporation, that is, they are focused on headcount, and that means that there is restrictions on how many employees, you cannot just hire people. Say, if a manager comes into my office and says, we need a man in the coming time, because this and this and this, well, I say, then we go out and hire a man. That is not how it works. Then I have to ask to get a headcount awarded for this area, and make arguments for why I have this need, and then I am awarded a headcount from a central place. It has been a rather rigid process. But that is also the reason why you will see that there has been a relatively large increase in our staff of contractors, because we have never, well, first the last year, had any control on the amount of contractors. There we could go in and say we need a contractor, we will take one in. So it has been easier that way. (Manager)

“Det, du kan sige der er restriktioner på, men det er jo kva det at vi er en amerikansk virksomhed, det er, der er man jo headcount fikseret, og det vil sige at, at der er restriktioner på hvor mange medarbejdere, der kan du ikke bare ansætte. Sige nu, åh, nu kommer der en manager ind til mig og siger vi har brug for en mand her det næste stykke tid fordi sådan og sådan og sådan, nå, siger jeg så, så går vi ud og hyrer en. Sådan fungerer det ikke. Så skal jeg ind og så skal jeg bede om at få tildelt headcount til det her område, og argumentere for hvorfor jeg har behovet for det, og så får jeg tildelt centralt sted fra headcount. Det har været en lidt rigid proces. Men det er også en af årsagerne til at du vil se at der har været en relativt stor stigning på vores contractors fordi vi har nemlig ikke på noget tidspunkt, eller først de senere år, har der ikke været en egentlig styring på contractor siden. Der kunne vi sådan set selv gå ind og sige ok, vi har behov for en contractor mere, så tager vi en ind. Så derfor har det været lettere på den måde.” (Manager)

We shall in section 6 return to the consequences of this new practice. The organization of TIDK changed especially with the acquisition of Condat and Tellital, because these two events caused TIDK to grow considerably.

5.2 Growth of TIDK and changing organization

Condat as mentioned earlier supplied software to TI, and TI eventually acquired Condat. Condat had sites in Aalborg and Berlin, and the people from the site in Aalborg became part of TIDK.

This meant that TIDK, with around 40 employees at the time, received around 35 new employees from Condat. All these new employees were software engineer working with protocol stacks. When integrating hardware engineers from ATL Research and software engineers from Condat into one company, management in TIDK not only face the problem that there were few working relations among the two groups. Another challenge were different ways of working among software and hardware engineers and an engineer-mentality regarding networking. The manager who was hired by TIDK in 2003 to perform the integration between the different groups within TI tells the following;

“... there is a big difference between software people in their work and then these hardware people. Because, one can say, our software people they have maybe, they have been far more concerned with process, right. Because it is software people and it demands a high degree of process orientation, whereas you have a more, what shall one call it, a result oriented approach at the hardware site. Well, you have to make the stuff work, right, and it can well be that you don't necessarily have to follow this sketched process to reach the goal, and make it work. That you have to, to a far higher degree, on the software side, right. There are more ways to Rome, if one can say so, on the hardware site. You can make such, just a green wire which runs from here to there if you have to. Well, it is a bit, it is because of the way they work that there is a difference. And that obviously shows itself also in different behavior and so internally. But when this now is said, well, yes then there are another thing also which brings its influence to bear, and then I'm back at this behavior. That typical behavior among engineers. They have difficulties in getting off the launching pad, well, they are introvert persons. So the issue of getting to know their own colleagues in their own house, well, I can go down and find engineers, even today, who don't know all people in this house. I have always known every single person in this house by name, and I can still hello Peter, hello Poul and Anders, even back when we were 220 people in this house. There are some here today, among the engineers, who don't even, well who cannot do this with everyone even though we only are around 75 engineers left, right. Well, and that is also the difference, because if you don't do something on your own, then, well, and this is what I mean, this is what has made it hard to unite people to be, because if not, the way you create a united culture is to make people talk together. Make people know each other. And that can be through parties and different gatherings, but you can also do it by, by trying to push people together in different circumstances and so. And you can say that purely professionally our software organization and our hardware organization have not had a lot of relations. Because the protocol stack people they had their area, right, and our hardware organization, they had their area. That is sort of it, and if they do not work together in their everyday life, then it is hard to make them create this united culture. But I think, well there haven't ever been any frictions in this house. There haven't been any problems and so seen in a larger perspective. But when I for example arrived, in this house, there you could see when you came down to the cantina, there the software people they were sitting there, and all the hardware people were sitting over there. So they were sitting in clusters. And that I really mean, that when we came down there in the start of 2007, there it was completely different. There they were mixed to a far higher degree” (Manager)

“... der er stor forskel på software folk de arbejder og så de her hardware folk. Fordi at, man kan sige, vore software folk har måske, de har, i langt højre grad har de været mere proces fikseret, ikke også. Kva det at de er softwarefolk og det kræver en høj grad af at være proces orienteret, hvor du har mere en, hvad skal man kalde det, hvad skal man kalde det, resultat orienteret approach på hardware siden. Altså du skal have det til at virke, ikke også, og det kan godt være at du ikke nødvendigvis behøver lige at følge den her skitserede proces for at nå i mål, på at få det til at virke, vel. Det skal du i langt højre grad på software siden ikke. Der er flere veje til Rom kan man sige på hardware siden, du kan lave sådan en pst (siger pst, lyd, ikke forkortelse), lige en grøn ledning, der går derfra og dertil, hvis det skulle være. Altså nej, der er sådan lidt, der er kva den måde man arbejder på er der en forskel, og det giver sig selvfølgelig udtryk, også i en forskelligartethed i adfærd også internt. Men når nu det er sagt, så, ja så er der en anden ting der også gør sig gældende det er at, så er jeg tilbage til den

der adfærd. Den der typiske adfærd hos ingeniører. De har jo svært ved at komme ud over rampen, altså, de er introverte personer. Så det at lære og kende sine egne kollegaer i sit eget hus, altså jeg kan gå ned og finde ingeniører selv i dag, der ikke kender samtlige folk her i huset. Jeg har altid kendt hver eneste person her i huset med navns nævnelse, og jeg kan stadigvæk sige goddag Peter goddag Poul og Anders, selv dengang vi var 220 mennesker her i huset. Der er nogle her i dag, der blandt ingeniørerne ikke engang kender, altså ikke kan det på samtlige folk selv om vi kun er, der er vel 75 ingeniører tilbage nu her ikke også. Altså, og det er også den forskel, for hvis ikke man selv gør noget, altså, så, og det er det jeg mener, det er det der har gjort det har været svært at samle folk til at være, fordi hvis ikke, den måde man skaber en fælles kultur på, det er ved at få folk til at snakke sammen. Få folk til at kende hinanden. Og det kan du gøre igennem fester og forskellige sammenkomster, men du kan også gøre det ved og, ved at forsøge at skubbe folk sammen i forskelligartede sammenhænge og sådan noget. Og det kan man sige, det, rent fagligt har vores software organisation og så vores hardware organisation ikke haft noget med hinanden at gøre. Fordi at protokolstakfolkene de havde deres område ikke, og så vores hardwarefolk de havde så deres område. Det er sådan set det, og hvis de så ikke i dagligdagen arbejder sammen så er det svært at få dem til sådan og få skabt den her fælles kultur. Men jeg synes, altså der har jo ikke på noget tidspunkt været nogen gnidninger i huset. Der har jo ikke på noget tidspunkt været nogle problemer sådan i større sammenhæng. Men da jeg kom f.eks., også her i huset, der kunne du se når nu du kom ned i kantinen, så sad software folkene, de sad der, og alle hardwarefolkene de sad derovre. Sådan sad man klyngevis. Og det mener jeg virkeligt, at når nu vi hen i starten af 2007, der var det helt anderledes. Altså der var man mixet og, i langt højere grad.” (Manager)

On top of this major increase, TIDK also received around 15 people from Telital R&D Denmark in Støvring in North Jutland. The reason for this infusion of Telital people is unclear, but apparently the reason was the following: The Italian Telital at the time owned the former Cetelco in Støvring, Telital R&D Denmark. Telital further had severe financial troubles, and at the time got a new manager in Italy, who was a former TI employee. Telital had previously used Siemens semiconductors, but with the new manager this changed to TI semiconductors and he created a deal with TI that if TI would take over some of Telital employees then Telital will buy a certain amount of TI chips. In the end Telital site in Støvring was shut down, and TIDK received 15 employees from Telital. Among these were some hardware people who entered the hardware group in TIDK and some software people who entered a tool group. The task of the software engineers in this tool group was to develop software tool necessary for the hardware engineers. They had therefore no relations to the protocol stack software engineers from Condat.

These events meant that within a relatively short time span the number of employees in TIDK grew from around 40 to around 100 people. This posed further challenges for the management, because now the previous construction with a managing director and two project leaders did not cut it anymore. To make matters more complicated, the Condat engineers was, as discussed earlier, allowed maintaining their old organizational structure after the acquisition. This means that even though they were sitting physically in the same house as the “original” TIDK people, they had their own organizational structure. The reason for this was that TI wanted to give the newly acquired Condat people a smooth transition to becoming part of TI, just as the acquired ATL Research people had gotten years earlier. As we have seen in a previous quote, one of the top managers in TIDK at the time believed that this decision was, seen in retrospect, an error, because this construction with a manager for the hardware people (former ATL people), a manager for the software people (former Condat people), and the tool group between these two groups, with no clear home base in management perspective, under one roof, meant that some potential synergies between the hardware and software people were missed.

That TI had brought up several small companies around the world and at the same time allowed them to function relatively freely as they did before the acquisition meant, that as the mobile

division of TI grew, so did the confusion amongst the sites. Different sites used different ways to organize the work and this led to confusion and problems in securing collaboration among the sites. Further, the technology became increasingly complex, as mentioned in section 3, and this also led to an increased demand for coordination among sites and planning of the work. Therefore TI made the so-called 'Crystal concept' around 2004, which was an organization change in TI where several certain roles and functions were defined in all the different TI sites. The objective was, as the name implies, to make the organization more clear. According to a manager TI is constantly developing its organization and changes happen continuously. However when looking back over the changes that have occurred in TIDK the Crystal reorganization marks the big change. A manager described the organization with TI as entrepreneurial before TI and more mature after crystal, as he explains:

"[ENTREPRENEURIAL PHASE BEFORE CRYSTAL] where it was really, where there was no formal organization, well there was such, but well, it was not really formal, it was more, what marked it was that it was a very dynamical organization, where it exactly was very important with networks right, well that people were putting their noses forward and asserting their own causes. And those who did so, they also came forward, and then it was them who got the charge to do some things. So what happens with crystal is that they try to formalize what had sort of grown organically within the organization. And that was because there was a need for it. Because people could not figure out who did what and how and so forth, right. So that was, well from my view, when I look back, then that is where you go from the entrepreneur phase into a more mature phase, where you formalize your organization. And that is probably the most important stage purely organizationally, you are probably right in that, when you say crystal, because it was the first real formal formalization of the organization, we can say. Well, what happens here, well I, basically nothing has been changed seriously structurally around the organization since that. What has happened is that new faces have come. And that happens often one can say. And with these new faces adjustments of the organization happens. And also reorganizations to a certain extent. And that we have, well of course we have been in a number of reorganization, because of new persons and such, who have arrived. But it has not meant so much other than that it has given, as all reorganizations does, some frustrations in the start right, because it is new and you do not know what this is, and so, so this is a natural slowing down where you say, oh, this is new and dangerous, right. So nothing else I think" (Manager)

"[Entrepreneurisk fase før crystal] Hvor det var meget, hvor der ikke var en formel organisation, det var der nok, men altså det var ikke, det var ikke så formelt, der var mere sådan, det der prægede den, det var en meget dynamisk organisation, hvor det netop var meget vigtigt omkring netværk ikke, altså at folk de i højre grad stak næsen frem og gjorde sig gældende. Og dem der gjorde sig gældende, de kom også fremad, og så var det dem der fik chancen til at gøre nogle ting. Så sker der det der med Crystal, det er at man prøver at formalisere det, der var ligesom af organisk vej, kunne man sige, dukket op, som organisation. Og det var jo fordi der var et behov. For folk kunne ikke finde ud af hvem gjorde hvad og hvordan og hvorledes ikke. Så det var den der, altså for mig er det, for mig at se nu når jeg kikker tilbage, så er det at du går der fra entreprenørfasen ind i en sådan mere moden fase, hvor du formaliserer din organisation. Og det er vel nok det vigtigste stadige rent organisatorisk, det har du nok ret i, når du siger den der crystal, netop fordi det var den første rigtige formelle formalisering af organisationen kan man sige. Æh, hvad sker der så, altså jeg, i bund og grund er der vel ikke ændret voldsomt meget sådan helt strukturelt omkring organisationen siden da. Det der er sket det er at der er kommet nye hoveder til, og sådan noget. Og det sker tit kan man sige. Og med nye hoveder sker der selvfølgelig justeringer af organisationen. Og også omorganisering i en hvis udstrækning. Og der har vi jo, ja selvfølgelig været inde i en del omorganiseringer, som følge af nye personer og sådan, der er kommet til. Men om det er nogle der har betydet så meget andet end at det har givet, som alle omorganiseringer giver, nogle frustrationer i starten ikke, fordi at det er nyt og man ved ikke hvad det her det er for noget, og sådan noget, så er der den her naturlige opbremsning hvor man siger, hu ha, det er nyt og farligt ikke. Så andet tror jeg ikke" (Manager)

The smaller changes have been in relation to different work areas. For example the organization “Solution Delivery” emerged within TI, with the goal of bridging the R&D departments within TI and the R&D departments out by the customers TI was working with, and in the later years of TIDK there were a Solution Delivery department within TIDK. There was also a layout unit, consisting of 4 engineers working on the layout of the printed circuit boards forming the basis for the reference designs. Another department was Tools that produced the software tools used by the hardware engineers in their work. Having sketched out the main changes in organization and management after the acquisition, it is now time to focus on the engineers and their work, and how that changed after the acquisition.

6 The engineers and their work

Seen from the perspective of the engineers working at TIDK, work has changed in two ways since the acquisition. Firstly the actual tasks have changed because of the changes in technology described before, i.e. the integration and the complexity of the solutions. This means seen from an engineering viewpoint that work tasks have moved up in the hierarchy if we use the classical V-model for software development to understand the development. This means that in the start the engineers were doing the deep development tasks, i.e. coding etc., but today some of them are moving up the sides of the V performing more architectural and testing work. An engineer with a software background told quote:

”Engineer: ... well, it has changed from, the superior coding jobs, programmer jobs, if one can call it that, those jobs are disappearing steadily. And therefore the work tasks are changing to more specification work, and, well seen from my seat it looks like, well there are still people doing such things, as so, but well, it is that way it is moving. For us to be in the general trend, and this is a general trend, then we move up into the food chain. And that is, then we work more on the architectural level. Just repeating my self, it was also what I said before

Kristian Hegner Reinau: So that means the deep part of the V development model goes to Asia

Engineer: Yes it does, it goes to Asia, but we still have some strengths here in our agile development model, what they are not so disposed towards in Asia. So those tasks are still here.”

”Engineer: ... Ja, altså, de har jo ændret sig fra at, stadigvæk det overordnede at kode jobs, programmør jobs, hvad man nu skal kalde det, de jobs, de forsvinder stille og roligt. Og derfor ændrer arbejdsopgaverne sig mere i specifikationsarbejdet, og, altså set fra min plads ser det jo, altså der er stadig folk der laver nogle ting, og sådan noget, men altså det er, det er den vej det går. For at vi skal være med i den generelle trend, det er en generel trend, så rykker vi højre op i fødekæden. Og det er, så vi arbejder mere på arkitekturniveau. Sidder lidt og gentager mig selv, det var jo også det jeg sagde, lige før faktisk

Kristian Hegner Reinau: Dvs. den der dybe del af v udviklingsmodellen den ryger til asien.

Engineer: Ja det gør den, den ryger til asien, men vi har stadig nogle forcer i form af vore agile udviklingsmodel her, som ikke, de ikke er så indstillede på i asien. Så de opgaver er stadig her.”

Secondly, the organization of TIDK and the management practices has changed, as described in the previous sections, and it is now time to focus on how this has influenced the engineers and their work within TIDK.

6.1 From no rules to tight planning

In the ATL days “there were no rules” some engineers told in interviews. Engineers would get an idea, ask their manager, get permission to pursue the idea, and then do so. In the end of 2008

work was strictly controlled through time schedules and work pressure. It was quite striking, that when asked about how controlled and supervised their work were, the engineers would say that it was not really controlled, because they got their assignments from their project manager, and then they would be free to solve this task on their own. One engineer explained, quote:

"...surveillance of the work, it is something like, if I, if I deliver the good that I have to deliver according to a plan, and of I do, well, then it is alright. If I don't deliver, then I have to have some reason for why it has not happened. So that is the way the control of the work functions as a see it"

"...overvågning af arbejde, det er sådan ligesom, får jeg, leverer jeg den varer som jeg skal i henhold til en plan, og leverer jeg så den varer, jamen så er det i orden. Leverer jeg ikke den varer, så skal jeg have en eller anden begrundelse for hvorfor det ikke er sket. Så det er sådan ligesom den måde styringen sker på sådan som jeg kan se det" (Engineer)

Another engineer explained in relation to how the management controls his work:

"Engineer: Right now it works so that we have some weekly meetings, where we sort of discuss what has to be done and who does what, and when does it have to be finished, and so. And then we shall give a status, also once a week, about what we have done. So that is so to say how it is, how it works at the time being

Kristian Hegner Reinau: Ok, has it changed through time

Engineer: Yes, well it has because now we are a lot more people on the same project, so it is a bit more like you are handed these tasks, and then you have to get them done. And maybe back then, you were almost the only baseband man on the project, so well, you sort of knew that you had to do the whole thing, and then you just had to take hold of the tasks yourself at a given time"

"Engineer: Lige for tiden kører det sådan at vi har nogle ugentlige møder, hvor vi ligesom diskuterer hvad der nu skal laves og hvem der laver hvad, og hvornår det skal være færdig til og sådan noget. Og så skal vi give en status, også en gang om ugen, sådan ligesom på hvad vi har fået lavet. Så det er sådan set hvad der er, hvordan det kører lige for tiden.

Kristian Hegner Reinau: Ok, har det ændret sig over tid.

Engineer: Ja, altså det har det jo selvfølgelig i og med vi nu er mange flere mennesker på samme projekt, så nu er det sådan lidt mere at man får udstukket de her opgaver, og så må man så få den lavet. Og det måske dengang, man var nærmest den eneste baseband mand på et projekt, jamen, så viste man ligesom at man skulle lave det hele, og så måtte man ellers bare selv tage fat i de ting på et givet tidspunkt."

The freedom of engineers in their work depends on their position within the hierarchy of engineers, as the following quote show. The engineer was asked about how management supervised his work:

"Engineer: Well this is one of the really good things, because in reality I am not [IS SUPERVISED BY MANAGEMENT IN EVERYDAY WORK]. I have completely free hands, almost free hands, of course not to go out and use a lot of money, but I have complete freedom to arrange my work.

Kristian Hegner Reinau: Is that something that has developed through time

Engineer: Yes of course, it has changed through time, I did not have that in the beginning. It is clear, it takes time to reach that. Of course, but that is also because I am, it is called technical lead, so it should be expected that I can figure out in what direction to go on my own."

"Engineer: Jamen det er jo en af de rigtigt gode ting, for det gør jeg jo reelt set ikke [IS SUPERVISED BY MANAGEMENT IN EVERYDAY WORK]. Jeg har fuldstændigt frie hænder, næsten frie hænder, selvfølgelig ikke til at gå ud og bruge en masse penge, men jeg har fuldstændig frihed til at tilrettelægge mit arbejde.

Kristian Hegner Reinau: Er det noget der har udviklet sig over tid

Engineer: Ja selvfølgelig har det udviklet sig over tid, det havde jeg jo ikke i starten. Det er klart, det tager tid at nå dertil. Selvfølgelig, men det er også fordi at jeg er jo det der hedder technical lead, så det må forventes at jeg også selv kan finde ud af hvad, i hvilken retning vi skal gå."

However, when asked to time schedules some engineer and manager said that the tight schedule, amount of tasks to solve and available resources meant that they had relatively little freedom to pursue their own ideas, build new competences and do networking within the organization. One engineer explained that it was easier to pursue ideas in the ATL Research years compared to the last TIDK years:

"There one can say, that when you do not have one big fixed time schedule which controls it all, well then it is easier to sometimes say, yes, that was a good idea, and travel over to talk to them there, and then you can just do this and this, so it is easier, when it is not all planned in a big big plan, and when there isn't fixed accounts for everything, and well, who have to pay the travel. Is it that project or that project, well, I will actually talk to people from there about this and people from there about that, so actually these four projects should share the bill. Well that we cannot do, and it has to, well what is your main project. Well that is that one. Well the main project does not have a huge interest in that, so therefore it is not going to happen. So earlier where you could say that things was not so firmly split up and controlled, well it was easier to do some things. In the moment things become more controlled, through tight programs and financial issues etc., well, then it is limiting, I had almost said automatically, the more cross site things. And also the work that are to make sure that the picture we have different places [IN DIFFERENT SITES] are soft of the same." (Engineer)

"Der kan man sige, når du ikke har en stor fast tidsplan som styrer det hele, jamen så er det lettere ind imellem at sige, jo, det var sku egentlig en god ide og rejse over og snakke med dem der, og så kan i lige gøre det der, og sådan og sådan, så er det lettere, når det hele ikke er lagt til rette i en stor stor plan, og der ikke er faste kontoer til alting og, jamen hvem skal betale rejsen. Er det det projekt eller det projekt, jamen jeg kommer egentlig både til at snakke med nogle derfra omkring det der, omkring det der, omkring det der, så egentlig burde de her fire projekter dele regningen. Jamen det kan vi jo ikke, og det skal jo, hvad er dit hovedprojekt. Jamen det er det her. Jamen hovedprojektet har ikke så stor interesse i det, så derfor sker det ikke. Så tidligere hvor man kan sige, tingene var ikke så fast delt op og så styrede, jamen der var det lettere at gøre nogle ting. I det øjeblik at tingene bliver mere styrede, af stramme programmer og kassetænkning osv., jamen så begrænser det, jeg havde nær sagt automatisk, sådan nogle mere tvær satselige ting. Og sådan ligesom, det der arbejde på at sørge for at det billede vi har de forskellige steder, det nogenlunde er ens." (Engineer)

This pressure on the engineers from their work plans originates according to one manager because in his view TI has a culture of using optimistic plans, as he explains in the following quote:

"You have always had a very optimistic evaluation of time schedules in TI. You have sort of had an idea that you had to, you were allowed to give an optimistic view, get them [CUSTOMERS] in early, and have slightly aggressive plans, and rest on people finishing quickly. You always had to push and push and push to speed up the development. But what happens now is just that people say yes without have control of it, and that is not only here in Denmark. You say yes without having and foundation. Even though you think that this is going to take 3 to 4 more spins than what is officially said it may take, well, then you may only make a plan saying that it will take 2 more spin, or something like that, right. And everyone knows

that in the end, well then we are going to make 5 or 6 or 7 or 8 spin on this before it works, right, unless it goes really well. And it never does. There will always be problems which you have not predicted. There will always be a problem with the chipset or some software, or with the board or what it is. Experience says so. But in regard to planning you are not allowed to plan more" (Manager)

"Man har altid i TI haft en meget optimistisk tidsplanplans vurdering. Man har haft lidt en ide om at man skulle, man måtte godt give optimistiske vurderinger, og få dem ind tidligt, og have lidt aggressive planer, og hvile lidt på at folk blev hurtigt færdige. Man skulle altid presse og presse og presse for at få fremskyndet udviklingen. Men det der sker nu det er jo bare at folk siger ja uden egentlig at have hånd omkring det, og det er jo ikke kun her i Danmark. Man siger ja uden at have belæg for det. Selv om man tror det her kommer til at tage 3-4 spin mere, end det der officielt siges at det må tage, jamen så må du kun lave en plan til at det skal tage 2 spin på det eller sådan et eller andet i den stil ikke også. Og alle ved godt at i den sidste end, jamen så kommer vi til at lave en 5-6-7-8 spin på det her for at det virker ikke også, med mindre at det går super godt. Og det gør det jo aldrig. Der vil altid være problemer som man ikke har forudset. Der vil altid være et problem med chipsettet eller noget software, eller med boardet eller hvad det nu er. Det siger erfaringen. Men planlægningsmæssigt får man ikke lov til at planlægge mere." (Manager)

According to another manager, it is normal practice in semiconductor companies to get customers involved early in plans to thereby save money, as he explained, quote:

"...the idea is to get them in early to do their job in the terms of evaluation, the reason for that is, to have them early involved is normally, if they get in too late, then you only find the errors on your side, but not when it is working in an application on their side. Meaning that in the end you end up making a spin only for the customer. And that's the reason why TI, and any other semiconductor company, is forced to get in customers as early as possible. That's the reason behind, because, there is real dollars behind it. Its cost." (Manager)

We should remember in this regard, that this is the situation seen from the some managers and engineer's perspective. Other managers and engineers believe that it is necessary with such pressure in plans. To understand this let us return to an issue from last section, the rigidity in the process through which new staff is employed in TIDK. There are two views upon this TI practice and the consequences of it. Seen from some engineers and managers viewpoint the rigidity in the hiring process makes their work difficult. This is because they feel that the decision about hiring or firing staff is taken somewhere in TI, without the people making the decisions having a view upon the engineering tasks the managers need to fulfill, and hence the manpower he needs, as another manager explains:

"... when you are in a company like this, then there is something, now there are so and so many people and now we have to save some money, so you have to get rid of 3 or 4 contractors during the year, or something like that. And it does not fit with what you have of tasks. Not at all. When you make a budget, then you can start to put in gabs, because now you do have this project, and that will stay, a lot of work will have to be done, and then you are told no, it has to be flat, right. You cannot get more people. And you don't know if you are allowed to replace people afterwards, right, if someone should quit. So you are actually in a situation where it works a bit like, well ok, then we just have to tell what we can do. But that does not help if the projects take too long time and so, but somehow they do not care. Well, they seems to be, right. There is no consequences from the fact that one say, well then we have to have the budget, and the people we have, and that we look at. And the cost, well, that they probably don't care about, that's not how they calculate now. And that is strange somehow. Because I cannot understand, one cannot guarantee this project to be successful, if you do not have the right staff. But it is more important with the financial numbers right now. It is the finance people who run it. It is not the engineers. (Manager)

"... når man kører i et firma som det her, så er det et eller andet, nu er der så og så mange folk og nu skal vi spare nogle penge, så i skal skille jer af med 3 eller 4 contractors i løbet af året, eller et eller andet i den stil. Og det hænger overhovedet ikke sammen med hvad du har af opgaver. Overhovedet ikke. Når du laver et budget, så kan du godt begynde at sætte gabs ind, for nu havde du godt nok det her projekt, og det kommer til at blive, der kommer til at skulle laves meget, og så får man at vide, nej, det skal være flad ikke også. Du må ikke få flere folk. Og man ved ikke engang om man må få lov til at replace folk bagefter ikke også, hvis der er nogle der skulle sige op. Så man står egentlig i en situation hvor det virker sådan lidt, jamen ok, så må vi jo bare fortælle hvad vi så kan lave. Men det hjælper jo ikke noget hvis projekterne tager for lang tid og sådan noget, men det er man på en eller anden måde lige glade med. Virker man i hvert fald til at være ikke også. Men der er ikke nogle konsekvenser af at man siger nå men så må vi jo budgettet sådan at det er de folk vi har og det ser vi på. Og hvad det har af omkostning, jamen det er man nok lidt ligeglad med fordi, sådan regner man ikke lige nu. Og det er mærkeligt på en eller anden måde. For jeg kan ikke forstå, man kan jo ikke garantere det projekt her til at være succesfuldt hvis ikke man har den rigtige bemanning. Men det er vigtigere med finansstallene lige nu. Det er finans folkene der styrer det. Det er ikke ingeniørne." (Manager)

Seen from another viewpoint also found in TIDK the rigidity is necessary because TI needs to make money on the business. Engineers are always able to make their work better and use more resources on it, and therefore it is necessary to make restrictions on how many resources there can be assigned to different work areas, as another manager explained, quote:

"Well they [THE ENGINEERS] think, and that they should probably also just do, well, they think, this is, I cannot handle this on my own, there is a need for more [WORKER RESOURCES], so I'll go to my supervisor, and then I am told that I cannot get it. We have to make do with what we have. And you can say, there will always, you could assign, we could be twice as many people here, right, because you can always do everything better. And you can always keep on sitting and messing around with it, when you have this type of work. So it is necessary that there are some restrictions on how many resources you can assign, because you can do it in all eternity. And that you can do, because, you can always find work, because you can, oh, if I could solve it this way, right, that could be exciting to have a look at, so I'm diving into it, and use 3, 4, 5 days to find out whether, argh, that was probably not the solution anyway. And that is super, because maybe some brilliant solutions shows up on that account, but if you also have to earn money at the same time, then there is not really room for it" (Manager)

Altså de [Ingeniører] tænker, og det skal de nok også bare tænke, altså, de tænker, her er der, jeg kan ikke klare det her selv, der er behov for noget mere [Arbejdskraft], så går jeg til min supervisor, og så får jeg at vide, at jeg ikke kan få. Vi er nødt til at klare os. Og du kan sige, der vil altid, du kunne tilføre, vi kunne være dobbelt så mange folk her, ikke, fordi at du kan altid gøre alting bedre. Og du kan altid blive ved med at sidde og fedte, når nu det er sådan en type arbejde her. Så derfor er der også nødt til at være en del restriktioner på hvor mange ressourcer man kan tilføre, fordi du kan gøre det i en uendelighed. Og det kan du, altså fordi, man kan altid finde arbejde, fordi at du kan, ov, hvis nu jeg kunne løse det på den her måde, ikke også, det kunne jo være spændende lige at dykke ned i, så dykker jeg ned i det, og så bruger jeg en 3, 4, 5 dage på at finde ud af om det, argh, det var nok ikke løsningen alligevel. Og det er jo alle tider, fordi det kan være der kommer nogle geniale løsninger op på den konto, men hvis du også skal tjene penge samtidig, så er der altså ikke altid plads til det." (Manager)

Observations I conducted in TIDK support that the engineers are focused upon the technical quality of their work and not economical issues. During a knowledge-sharing conference held for the hardware in TIDK, in which I participated as an observer, a representative from another big company in the industry gave an presentation, where he made it clear that today the company, which he was representing, was earning money on mobile phones, but tomorrow they would

make something else, if they could not earn money on mobile phones. This and other statements during the presentation regarding the company's focus upon economical issues raised a number of critical questions from the gathered TIDK hardware engineers about how the company valued technical quality of their phones versus cost considerations. The point made by the representative was that cost was in focus and the phones produced had to have the necessary quality level, and no more. The engineers seemed to be critical about the focus on cost, and seemed to believe that the technical quality of the phones, and not cost issues, should be the focus. I later discussed this observation with a manager in TIDK, and he said that the observation was true, the engineers were focusing on quality and not thinking much about cost. But he also saw this situation as something normal in a company like TIDK, where there is quite a distance between engineers working on technical issues and marketing and sales people in touch with the market and economical issues. He explained the following, quote:

"We are a development company, we are not sitting, we don't even have a sales organization here, you see, so therefore we are a long way, in principle, a long way from the market, right. Well, the contacts our engineers have at our customers, those are on an engineering level, again, it is not into their sales and marketing departments, well, not from here. So therefore they do not have that, what should one say, commercial approach to it. Well, they have a technical qualitative approach to it, and that is fine. And that is also how it has to be, because it is their task, which is to develop the products and make sure they become state of the art. But there also have to be a pressure that works a bit against their state of the art, right. So that is the clash you are experiencing. And that I only see as a natural clash. It is the same you meet in a production firm with a sales organization right. It is a natural conflict between sales and production because there are different priorities that have to be fulfilled" (Manager)

"Vi er jo en udviklingsvirksomhed, vi sidder jo ikke, vi har jo ikke engang en salgsorganisation her, vel, så derfor er vi jo langt, i princippet langt væk fra markedet ikke. Altså, de kontakter som vores ingeniører har ind til vores kunder, det er jo ind på ingeniør niveauet, igen, det er jo ikke ind i deres salgs og marketingsafdeling, altså, det er ikke herfra. Så derfor har de slet ikke den der, hvad skal man sige, kommercielle tilgang til det. Altså, de har en faglig kvalitativ tilgang til det, og det er fint. Og sådan skal det også være, fordi det der er deres opgave det er at udvikle produkterne og sørge for at de bliver state-of-the-art. Men der skal så også været et press der holder lidt igen på deres state-of-the-art ikke, fordi der skal også være økonomi i det, ikke. Så det er det du oplever, det er det clash du oplever. Og det ser jeg bare som et naturligt clash. Det er det samme som du møder i en produktionsvirksomhed med en salgsorganisation ikke. Der er en naturlig konflikt imellem salg og produktion fordi der er forskellige prioriteter der skal opfyldes." (Manager)

In the ATL Research time employees were aware that the survival of the company depended on the success of the individual projects. People were therefore putting long days into the work when necessary. Their logic was simple: ATL Research did the project alone, so the employees had to do all the tasks in the project, as one manager said, quote:

"You knew what you had to do, because you had to do it all, right. You knew what you had to do because you had to get it all done in time, you had to get the whole way round, there was no unclear work split with anyone." (Manager)

"Du viste også hvad du skulle lave, for du skulle lave det hele, ikke også. Du vidste hvad du skulle lave for du skulle nå det hele, du skulle nå hele vejen rundt, der var ikke noget uklart worksplit med nogen." (Manager)

Within TI the employees found themselves part of a large concern with hundreds of employees spread among different sites around the world and millions of dollars flowing around. The complexity of the product, the size of the organization, and political games within the organization,

apparently made it unclear what tasks that should actually be done at TIDK and other TI sites. It apparently also made people accept economically inopportune situations. People at TIDK were for example well aware that some work was done twice within TI. Exactly the same tests for example was being done at different sites within TI, but as one manager explains, one of the higher CEO in TI at the time did not worry much about this because, then he was sure the tests was done properly. This apparently didn't bother the engineers; possibly because of the situation where a large profit was still being made in the industry, refer also to the point in the quote above that the engineer got used to the high bonuses within TI in the early years. Another example is that nobody had the overview of the projects, the result being that people within TI was not sure that all the work tasks relating to each project, regarding tests etc., was actually conducted during the projects. In the ATL Research time the engineers had such an overview of this because they had to do all the tasks themselves within the small company. Such overview would not be constructed in TI before the beginning of 2008 where a document describing the way a project should precede, the different work tasks etc., was created in TI.

6.2 Consequences of planning and resource control

The previous section explained how the planning and control over resources within TIDK has become tighter though time, and that this was seen as a necessity by some managers and engineers while other saw it as something problematic. Let us therefore focus on the consequences for the engineers of this planning and resource control. One manager/engineer describes them as:

"There is no doubt that the engineers are influenced by it, well, anyway if we have to do a lot more than we can do in time, and if we are not allowed to make the quality we have to make, well, then who wants to work extra hours, for example. Who wants to do more than necessary. Well, then I just wait until my boss tells me what I shall do, because it won't be worth the trouble, that I start investigating whether the quality is ok, if I have a suspicion about something. Of course this is to explain it in an extreme way, and of course there is someone who maybe does it, but it is clear, you do not have the incentive to go the last distance. (Manager)

"Der er ingen tvivl om at ingeniørerne bliver påvirket af det, at jamen hvis vi alligevel skal lave meget mere end vi kan nå, og hvis ikke vi må lave den kvalitet vi skal, hvem gider så arbejde ekstra timer for eksempel. Hvem gider at gøre mere end nødvendigt. Altså så venter jeg bare på min chef siger hvad jeg skal lave, fordi det kan ikke betale sig, at jeg begynder at undersøge om kvaliteten nu er i orden, hvis jeg har en mistanke om noget. Selvfølgelig er det måske grelt sagt, og selvfølgelig er der også nogle der måske gør det, men det er klart at man har jo ikke det samme incitament til at gå det sidste stykke." (Manager)

Another consequence of the size of the TI organization is that people loses the personal relation to their work. This is a clear difference to the ATL Research days where the employees in the company were conducting all the tasks themselves. The consequence of this lacking personal relation to their work as well as the uncertainties regarding who owns the projects within the organization leads to falling engineering pride in the work.

"... the professional pride has clearly decreased, you are in doubts about what you stand for here in Denmark, according to my belief, how good one are, and one good enough at this, and that is simply because we have not managed to prepare us well enough for the future while we have been busy. So there we have to make other priorities, we have to invest in the areas we want to". (Manager)

"...den faglige stolthed den er klart faldet, man er i tvivl om hvad man står for her i Danmark, efter min overbevisning, hvor god man er, er man god nok til det her, og det er simpelthen fordi at vi ikke har formået at forberede os godt nok til fremtiden også samtidigt med at have

travlt. Så der skal vi prioritere anderledes, vi skal have investeret i de områder som vi vil” (Manager)

One manager described, that with the pressure on the work in the latter years of TIDK, the uncertainty regarding the position of TIDK within TI, and political games blurring the reason d’être for TIDK, it is hard to maintain pride in ones work, quote:

” When you are pressed from the sideline, and don’t know how the responsibility is, and you do not feel that you are valued for what you do, then of course the professional pride decreases. When people out in the world is in doubt to what they are actually doing in Denmark, ok, that they had apparent not heard about, well, then the professional pride of course also decreases, because then you are worth less in the organization. So you are more dispensable. And therefore I sometimes think, well ok, if they want to, then they can just close down this site. That they can just do, it is 130 people, but what is it we can do that the other people cannot do. The only thing we have as a core competence right now that is to make printed circuit boards for phones right, but how good are we at that, you can ask afterwards, how good are we. That the question you ask yourself, are we so good, that we could not be replaced with somebody else. Or do we have so much knowledge that there is no other who can obtain that knowledge relatively fast and so forth, right.” (Manager)

” ... når man bliver presset ind fra sidelinien af, og ikke ved hvordan ansvaret er, og man ikke føler man bliver værdsat for det man laver, så falder den faglige stolthed selvfølgelig. Når folk ude i verden er i tvivl om hvad laver de egentlig i Danmark, ok det havde de åbenbart ikke hørt om, jamen så falder den faglige stolthed selvfølgelig også fordi, så er man jo mindre værd i organisationen. Så er man mere undværlig. Og det gør jo også at man tænker nogle gange, nå ja, men hvis de vil, så kan de jo bare lukke den site her. Det kan de jo bare gøre, det er 130 mænd, men hvad er det vi kan som de andre ikke kan. Det eneste vi har som core competence lige nu det er at lave print til telefoner ikke også, men hvor gode er vi til det, kan man så spørge bagefter, hvor gode er vi. Det stiller man sig selv det spørgsmål, er vi så gode at vi ikke kunne erstattes af nogle andre? Eller har vi så meget viden at der ikke var andre der nemt kunne få den viden rimeligt hurtigt og så videre ikke også.”

Another manager told than we he entered ATL Research there were around 30 employees, everyone knew each other, and he almost knew the CEO personally. This also meant that sometimes people would work around the clock to reach deadline. When ATL Research became part of TI this changed a bit, work slowed down slightly, because the organization got bigger and more complex. One example he gave was, that as the projects got complex and the amount of information the employees received therefore increased, then it was easier to “burn out” sometimes, and therefore having to slow down the work. Another issue was that because of the increased complexity and bureaucracy, it was often necessary to get permission to do different thing from other sites, for example from TI Dallas, and that meant that if the issue emerged in the start of the working day in TIDK, then people in TIDK would have to wait up to a number of hours until people in TI Dallas was coming to work, because of the time difference, and firstly thereafter people in TIDK could get permission, and continue work on the issue. This meant that he could sometime be lulled to sleep, quote

” sometimes you, the whole big mill can sometimes lull one into sleep a bit. Understood in the way that if you work with something you have to finish, well, that information you can only receive in three to four hours from now, because that is when guy in Dallas is working. (Manager)

” ... man kan godt nogle gange, hele den der store mølle kan godt lulle en lidt i søvn. Forstået på den måde at man, hvis man arbejder med et eller andet man skal være færdig med, jamen den information kan man først få fordi ham i Dallas er altså først på arbejde nu her om fire timer” (Manager)

An engineer used the term “the happy ATL days” when he answered a question in an interview, and when asked about what he meant with this, he explained that when he started in ATL Research it was like a small family, and he could clearly see the impact of his work, and therefore make a difference personally for the company. As part of TI it was more difficult to see this impact, because now he was just one among 30.000 other people, quote:

“Well, I think for me, well, of course it was exciting back when you were in a small company and you made a difference, well you made a difference on the bottom line, right. You knew that. Ok, now this turned out good, so it went good for the customer, and well, that was exciting. Now it is a bit like, well ok, I am one among 30.000 people, well, tssst [HE LAUGHS]. Of course you still make a difference on the bottom line, but you just cannot see it anymore.” (Engineer)

”Ja altså for mig, der synes jeg, altså, det var da spændende dengang man var et lille firma og man gjorde en indflydelse, altså man havde en indflydelse på bundlinien ikke. Det viste man jo. Ok nu blev det her godt, så gik det godt for den kunde, og altså, det var da spændende. Nu er det sådan lidt, jamen ok, pyh, jeg er en blandt 30000 mennesker altså puh, he he. Selvfølgelig gør man stadigvæk en indflydelse på bundlinien men man kan bare ikke få øje på den mere.” (Engineer)

He also explained the in the later year TI became rather bureaucratic. In the early years it was relatively easy to make decisions in projects and work according to these, whereas in the later year, due to the complexity of the projects, the process was rather bureaucratic seen from his viewpoint because of all the persons involved in decisions.

”Engineer: Well, if you compare to the earlier projects, there it was more in the way that we sort of defined what we wanted to do, and then we did it, and we solved the problems we encountered during the way, and that was sort of it. Now it is much more, what can one say, bureaucratically, if we believe that this solution will be better compared to the other solution, well, then it is not just so that we can choose the good solution. No way, it has to go up the whole way through, and it has to be approved, and it has to go into god know how many documents before we can decide it.” (Engineer)

”Jamen, altså hvis man tager i forhold til de tidligere projekter, der har det jo meget været sådan, at der har vi sådan ligesom gået ind og defineret hvad vi vil lave, og så har vi lavet det, og løst de problemer vi er stødt på hen af vejen, og så var det ligesom det. Altså nu er det meget mere, hvad kan man sige, bureaukrati ind over, at hvis vi synes at den der løsning den vil være bedre frem for den anden løsning, jamen så er det ikke bare sådan at ok, vi tager den gode løsning. Næ nej, det skal op igennem hele vejen, og det skal godkendes og det skal ind i gud ved hvor mange dokumenter før vi kan beslutte os for det” (Engineer)

According to the engineer this change has occurred continually during the TIDK time

”... it has actually happened continuously. It has, as we have grown with time. Also TI, well, wireless within TI has also grown tremendously the last years. So it is something which has occurred continuously, there have come more and more, things have become more and more troublesome, and there are more and more stakeholders, there has to be made more and more documents about the issues before you start.” (Engineer)

”...det er faktisk sket løbende, det er det, eftersom vi er vokset med tiden også, også TI, altså, wireless indenfor TI er også vokset voldsomt meget de senere år. Så det er noget der er sket sådan løbende, der er kommet mere og mere, tingene er blevet mere og mere omstændige, og der er flere og flere stakeholders, der skal laves flere og flere dokumenter omkring tingene før man ligesom sådan går i gang” (Engineer)

He further used a very specific example regarding memory in mobile phone to illustrate the consequence of this bureaucracy seemed from an engineering perspective:

"Engineer: ... there is always business people, there are marketing people who have some interest, and there is technical interests from different places and so on. Examples, what can I come up with, well it is something like, if we now take a pretty platform like this, to become a bit technical. It is possible to use different types of memory, you can use something called Nor flash or Nand flash or DiskOnChip, there are different solutions on the market. The more people you ask, the more opinions there are. So the first platforms we made, well, there we chose a type and put that on, and then that was the one we were working with, and that worked fine. And then when the customers had to make their phone, then they maybe chose another one, and then they had to do a little work to make the change. But on the last couple of boards it has been something like the following. This customer wants that, and that customer wants that, marketing thinks that is smart, and technically the other one is necessary. So we have ended up having three, four and five different types of memory on one board. Which gives a hell of a lot of technical problems, and you sit and use energy solving a lot of technical problems which are caused by things that are not really necessary, you can say. I think that has been a bit frustrating.

Kristian Hegner Reinau: Why don't you cut through it, and say that we have to have that kind of memory

Engineer: Because, well I am just sitting as a small piece in this game. I cannot decide what goes on. We can maybe from the top level of TIDK have some influence, but anyway, we don't have the whole power, one can say."

"Engineer: ... der er altid business folk, der er marketingsfolk der har nogle interesser, der er tekniske interesser, der kommer fra andre steder og sådan noget. Eksempler, hvad kan jeg lige finde på, altså der er sådan noget med, at hvis nu vi tager sådan en fin platform her, for at blive lidt teknisk. Så er der mulighed for at bruge forskellige typer memory, man kan bruge noget der hedder Nor flash eller Nand flash eller DiskOnChip, der er forskellige løsningsmuligheder på markedet. Jo flere mennesker man spørger, jo flere meninger er der. Så de første platforme vi lavede, jamen, der valgte vi en type og satte den på, og så var det den man arbejdede med, og det fungerede fint. Og når så kunderne de skulle i gang med at lave deres telefon, så kunne det så være at de valgte en anden type og så måtte lave et lille arbejde for at arbejde sig over på den. Men som det har været på de sidste par boards vi har lavet, der har det gerne været sådan noget med, at ok, den kunde vil have det, og den kunde vil have det, marketing synes det er smart, og teknisk er den anden nødvendig. Så vi har endt med at have både tre fire og fem forskellige slags memories på et board. Hvilket giver en pokkers masse tekniske problemer, som egentlig er fuldstændige overflødige og spild af energi, man sidder og bruger energi på at løse en masse tekniske problemer som er opstået af ting som egentlig ikke er nødvendige, kan man sige. Det synes jeg har været lidt frustrerende at.

K: Hvorfor skærer i ikke bare igennem og siger at vi skal have den slags memory

J: Ja, men fordi, altså jeg sidder jo som et lille brik i det her spil, jeg kan ikke bestemme hvad der skal sættes på. Vi kan måske fra øverste sted i TIDK have en vis indflydelse, men altså alligevel, så har vi jo ikke helt magten kan man sige."

We can ask then, within this bureaucracy: what incentives do the engineers in TIDK have to do their work well. As discussed in section 5 they are paid well compared to similar engineers in other companies. However, engineering reputation or pride to use another word, apparently mean more to engineers than monetary rewards. The customers whom TIDK supplied in the early years were mainly customers in Asia who produced phones according to the designs made by TIDK. This gave the engineers some pride in their work because they could see the phones they designed come out on the market and be used in society. Some of the models also came out on the Danish market. In the latter years of TIDK the engineers did not see this happen anymore.

Now the customers of TI were few of the largest players in the industry, for whom TI, and hence TIDK, developed platforms that formed the basis for further development. The customer would themselves do a lot of further development on the basic designs supplied by TIDK, and therefore the engineers in TIDK would not see 'their' designs hit the market anymore, but just phones building on their design¹³. This meant that they would not feel that it was 'their' phones hitting the market anymore. This meant that the engineering reward or satisfaction of seeing their work used in society was lost for the engineers. Further according to a manager, earlier the engineers were in contact with the customers who produced the phones, and this gave access to information about what solution that functioned, problems etc. Today they are only in contact with other engineers and this feedback has therefore become more difficult to obtain for the engineers. This means that regarding incentives, the engineers had to be good at 'clapping their own backs' in the latter TIDK years, as one manager explained, quote:

"I think you have to be good at clapping your own shoulder in R&D. Sometime one of the higher CEOs come and say that this site is indispensable and such thing, and that he has to say always. Of course it gives a shot, well, it is nice to hear that they are counting on us and such things, but if you are a little down-to-earth, and think a bit, then of course that is what they are telling all the sites, because they want all the sites to feel indispensable, so they work the most and become as motivated as possible. So if they did not do that, then they wouldn't be doing their job right. So I think that what you have to focus on, that is whether you have some CEOs who are actually doing something for your site. That they are actually helping your site to get into a better position. And there I have my doubts currently. (Manager)

"I R&D der tror jeg man skal være godt til at klappe sig selv på skulderen hvis det er. Der er jo engang imellem en af de højre chefer der kommer og siger at den her site er uundværlig og sådan noget, og det skal han jo altid sige. Det giver selvfølgelig et kortvarigt, jamen det var rart at høre at de regner med os og sådan noget, men hvis man er lidt nøgtern og tænker sig lidt om, så er det selvfølgelig det de siger til alle sites fordi de gør jo noget ud af at alle sites selvfølgelig skal føle sig uundværlig, så de laver mest muligt, så de bliver mest muligt motiverede. Så hvis ikke de gjorde det så gjorde de jo ikke deres arbejde ordentligt. Så jeg tror der man skal kikke på det, det er hvis man har nogle chefer om de rent faktisk gør noget for ens site. At de egentlig rent faktisk prøver på at hjælpe ens site til at komme i en bedre position. Og der har jeg min tvivl i øjeblikket" (Manager)

As this manager also states in the quote, it was, for him, in the latter years, difficult to see what was done in management within TI to support TIDK. Let us therefore focus on how new competences was built in TIDK.

6.3 Creation of new competences

When engineers or managers in TIDK spot new areas in which they wish to develop competences there are two ways to do so. Either people can be sent to participate in courses held internally in TI or bought outside TI dealing with the given topic, or they can learn it by working on the issues along with engineers from other sites within TI that have knowledge about the topic. According to a manager it is important to back the course participation with practical work on the issue afterwards, quote:

"Also, it is not sufficient, it is my experience, an official course, I mean you send the guys for best case a week, and it is more on at theoretical level, but then you really touch the stuff and you really work with it, and more questions raise than you can get answered in an official

¹³ It should here be mentioned that some engineers in TIDK still see the rewards of their work, for example people working with the layout of the printed circuit boards, but this is a rather small group compared to TIDK as a whole.

course. So then the man training aspect is very efficient, after you got the foundation of a new system, you have a guy you can work with, you have maybe even the same topic to work on. Or the same chipset to work on, do a similar type or a complementary type of validation, and then you're really touching the details enough so after half a year you are really good." (Manager)

"To really have a deep dive technical expertise you need to touch stuff, it is not sufficient to do it in a professor like style watch on the theory and hope it is working like wish, I mean the real problems come if you work, when you start working with the software and the hardware" (Manager)

When people are learning new competences through working on the projects, then it is done on real projects, i.e. not "training projects" with the goal of building competences, but "real projects" that fit into the projects running within TI. Sometimes a combination of the two possibilities is used, as a manager here explains:

"It is on the job. It's on the job training, we call it on the job training because then the people they have no conflicting priorities, we know this is what we need to have, but the expectation level is of course adjusted so we have a non-expert starting to ramp up, you cannot have the same, but in order to make sure that he can really ramp up his expertise, his skills, he gets a type of teacher, mentor, at the site which is already a long time in this business a long time on this domain and who understands it to depths, so it has to, sometimes what I did in the past was also to have this started, and then after a while, 3 months, we send him to an official course to learn the basics. It is very efficient also, because then they really can ask very tricky questions already, and then get a lot of benefit out of the course." (Manager)

If we look at the incentives for the engineer to join such activities, then interestingly it is more the recognition they obtain from being selected to join such activities and the recognition stemming from being an expert that is the incentive rather than the monetary reward. A manager explain:

"Not money wise if you think of that, but recognition wise, so normally, if we put guys on a new or a freshly to be developed domain, or area, then we do a very careful selection, and you can imagine that someone you don't believe in to catch up, it is an investment for a company, it is an investment, you spend not only money for the external training or internal training, think it is not a question of dollars only, but it is a question of how much time of your experts you spend to build the, to duplicate the expertise. This is the real pain, because it is closed down projects that are most of the cases already in a critical phase" (Manager)

This fits with the earlier discussion about engineers being more focused upon technical issues than economical issues. These are these possibilities of building new competences, but due to the pressure on the company in recent years there had been little time to develop new competences within the company, one manager explains:

"if you are under pressure to produce, I almost said, then it is obvious, that there isn't the extra time for starting, for starting investigating exciting new things. And I think, or, I know that, that the organization has felt this even more, especially the last year and a half" (Manager)

"hvis du er presset på at skulle producere, havde jeg nær sagt, så er det klart, så er der ikke ekstra tiden til at sætte, gå i gang med at kikke på nye spændende ting. Og det tror jeg nok, eller det ved jeg, det har organisationen bestemt følt endnu mere på sig, specielt det sidste halvandet års tid" (Manager)

In this vein we should also look at how engineers are evaluated. Twice a year engineers are evaluated and a Development and Performance Management (DPM) talk is held with a manager

or supervisor. The DPM talk consists of two parts. In the first part priorities are set for the whole next year, i.e. for example carrier plans. Then in the second part of the DPM so-called Key Result Areas (KRAs) for the employee for the next half year is discussed. In this discussion the manager or supervisor has to specify 3 to 5 individual goals for the employee. These goals shall function as the guidance for the work in the following half year. However, as one engineer explains in the following quote, there are sometimes a distance between the goals set in the discussion in the first part of the DPM and then the time and resources given to the engineer to reach these goals in practice, i.e. in their every day work:

"We have something that is called, is called, DPM talks I think is the name, I must admit that I do not even remember what it stands for. At these we make, well, what are your goals for yourself, where do you expect to be in 3 years, in 5 years, and such soaring stuff. And then you have to try and make a plan, carrier plan, and then we meet every half year, well, how is things going, how do you think it is going, how does the company think it is going, and so on. Now I haven't been here for a long time, so I don't have a long story to build on, but my immediate feeling is that it is not connected so much to everyday life. That it is sort of, well, you can have some good ambitions about what I want to do in 3 years or in 5 years, I want to make myself good within this and that field, but then when we comes to everyday life, well, who is then going to approve that you go on some course which cost x thousands of dollars or something. Or who is going to say that it is ok that you spend 10% of your working time on some profession or field because you need to build some experience (Engineer)

"Vi har noget der hedder, hvad hedder, DPM samtaler tror jeg det hedder, må indrømme jeg kan ikke engang huske hvad det står for. Hvor vi så løbende sætter jamen hvad har du af mål for dig selv, hvor forventer du at være om 3 år om 5 år og sådan nogle højtloftige ting. Og så må man ligesom forsøge at ligge sig en eller anden plan, karriere plan, hvor vi så mødes hvert halve år, jamen hvordan går det, hvordan synes du selv det går, hvordan synes firmaet det går, osv.,. Nu har jeg ikke været her så lang tid, så jeg har ikke en lang historie ligesom at hænge det op på, men min umiddelbare fornemmelse er at det hænger ikke så meget sammen med hverdagen. At sådan ligesom, jamen du kan godt have nogle flotte ambitioner om at det er det her jeg gerne vil om 3 år eller 5 år, jeg vil gerne gøre mig dygtig indenfor det og det område, men når vi så kommer til den daglige dag, jamen, hvem er det så lige der godkender at du ryger på et eller andet kursus som koster x antal tusinde dollars eller et eller andet. Eller hvem er det siger at det er i orden at du bruger 10% af din arbejdstid på et eller andet fag eller delområde fordi der skal du altså opbygge noget erfaring." (Engineer)

The engineer further explained that in the ATL Research years there were no such evaluations, and that he saw them as something that had to be done in an organization like TI, even if they did not influence the daily work in practice, quote:

"No, there was nothing [Evaluation in ATL Research], well, it is sort of, probably arrived with us becoming part of a huge company in Texas, and there you do some things, probably in accordance with some rules, well, just like there is work environment and work place evaluation, well, then you also have to do such plans for people. And the things that are written in such plans, whether they necessarily are reflected in your everyday life, there is no immediate guarantee for that" (Engineer)

"Nej der var ingenting [Evaluering i ATL Research], altså, det er noget som er ligesom, sikkert kommet med at vi er en del af et stort firma i Texas og der gør man nogle ting, og sikkert i henhold til nogle regler, jamen ligesom der er med arbejdsmiljø og arbejdspladsvurdering, jamen så skal man også lave sådan nogle planer for folk. Om de ting der så står i sådan en plan, om de nødvendigvis også bliver afspejlet i, hvad skal man sige, i din dagligdag, der er ikke nogen umiddelbar garanti." (Engineer)

The consequence of the lacking time for building new competences is that engineers use solutions they know and have tried before without looking into new possibilities, quote:

"... you have to build some competences to be able to do your work forward. Well, that is important. In part you have to add for example 3G competences, right. In part you have to do it within your field too, well, if you take the printed circuit board, then you should not just sit and do six layer PCBs the whole time, if, you also have to get in and investigate whether this could be done on say four layers, right, and could another type of material make it cheaper and better and more efficient, right. And it is right, that the more pressed you are, the less time there is for new thinking in that direction, right, because then you just do as you always have done, right. Well, you find the solutions you know work, and which you have tried before, right" (Manager)

"... du skal jo opbygge nogle kompetencer for at også kunne lave dit arbejde fremadrettet. Altså der er det jo vigtigt. Dels skal du tilføje f.eks. 3G kompetencer ikke også. Men dels skal du jo også indenfor dit felt, altså hvis man nu tager på print siden ikke, så skal du jo ikke bare sidde og lave 6 lags print hele tiden, hvis, du skal også ind og kikke på kunne det her gøres på f.eks. 4 lag, ikke, og kunne en anden type materiale anvendelse gøre, at det ville kunne gøre det billigere og bedre og mere effektivt ikke. Og det er rigtigt, jo mere presset du bliver, jo mindre tid bliver der jo til at ligesom ny tænke i den retning ikke, fordi så gør du bare som du altid har gjort, ikke. Altså, du finder de løsninger som du ved virker, og som du har prøvet før, ikke." (Manager)

To combat this development the management in the hardware group of TIDK held an internal knowledge sharing competence in the beginning of 2007 followed by another in the fall of 2008. I participated in both as an observer. Both were two days events where people from both within and outside TIDK gave presentations about different technical issues to increase the knowledge sharing within TIDK and build up new competences and the evenings consisted of network-building activities. In the 2007 conference a "competence group program" was launched. The objective of this was to make people participate in groups where they could discuss technical issues of interest and develop new knowledge. Different groups were made with different focuses, and in the launch-speech the development director of TIDK said that people would be given time by their superiors to participate in the work in the groups. Status by the end of 2008 was however, that the groups started out quite well, but then activities within the groups died out, due to the work pressure on the engineers. The manager who launched the groups explained:

" [ACTIVITIES WITHIN THE GROUPS DIED] because there is simply not time for it, because it all goes to execute on programs. Our business is under very high pressure at the moment, so we are not allowed to use time on such stuff. We don't have people enough to use time on that. Even if it is important, then we actually, well I certainly try to push the managers to make sure that they reuse as much as possible, and though that the DU managers, to share knowledge, to make sure that we don't sit and do the same things twice" (Manager)

"[Activities within the groups died] fordi der simpelthen ikke er tid til det, fordi det hele går på at eksekvere på programmerne. Vores branche er meget hårdt presset lige nu, så vi får ikke lov at bruge tid på den slags. Det er fordi vi har ikke folk nok til at bruge tid på det. Selv om det er vigtigt, så bruger vi egentlig, bruger jeg i hvert fald det, jeg forsøger at presse faggruppeliderne til at sikre at de genbruger så meget som muligt, og af den vej får DU lederne, og dele viden i virkeligheden, for at sikre at vi ikke kan sidde og lave de samme ting to gange" (Manager)

An interview with an engineer supported this. He explained that TI has some bullet points which suggest how the employees should act in their work life. Among these is a point encouraging engineers to build networks between TI sites. However, due to available time and resources as well as lacking rewards for complying with this, the impact of the point is rather low. The engineer explains:

"Engineer: There are some, TI have some, each year some new, what is it called, some top bullet points, important priorities, that is it, obviously that it is important to solve the problems of the customers, and make sure that we earn some money, so to say, etc.. But one of the priorities is also, make sure to keep contact across sites etc, but that is one of the things, which due to the fact that it is not automatically backed by the programs running, or the projects, well, then it is easier to die, if you are not, I had almost said, are a fiery soul in cultivating it. And one can also say that there is nothing animating you to do it in everyday life.

Kristian Hegner Reinau: It is not a pressure or

Engineer: Not at all, well the stuff that is important in everyday life is that you do what it says in the big plan. That is largely what you are weight and measured upon. What you do or do not do besides this, that is less important. In the big game anyway. There are probably some managers who will say different, that we are of course encourage that you do this and that, or that you take part in those things, yes, but you, well we don't make time and resources available for it, but we would like to see you do it.

"Engineer: Der er nogle, TI har nogle, hvert år kommer der nogle nye, hvad fanden hedder det, sådan nogle top bullets, hvad er vigtigt ikke også, prioriteter, der var det, at det vigtige det er selvfølgelig at løse kundens problemer, og sørge for at vi tjener nogle penge havde jeg nær sagt, osv.. Men en af prioriteterne er også, sørg for at have kontakt på tværs af sites osv., men det er en af de ting, som i og med at det ikke er noget som er automatisk understøttet af de programmer der kører, eller de projekter der kører, jamen, så er det lettere til at dø hvis man ikke selv, havde jeg nær sagt, er en ildsjæl for at opdyrke det. Og man kan sige der er ikke noget der animerer dig til at gøre det i hverdagen.

Kristian Hegner Reinau: Der er ikke et press eller

Engineer: Overhovedet ikke, altså det der er vigtigt i hverdagen, det er at du får lavet det der står i den store plan. Det er det du stort set bliver målt og vejet på. Hvad du får lavet ved siden af, eller ikke får lavet ved siden af, det er mindre vigtigt. I hvert fald sådan i det store spil. Der er nok nogle chefer der vil påstå noget andet, at vi påskynder selvfølgelig at du laver det og det og det, eller at du også blander dig i de ting, ja, men du, vi sætter godt nok ikke lige tid og ressourcer af til det, men, vi ser gerne at du gør det."

The engineer further explained that time and resources for participating in networking activities with other TI sites were the limiting factors, quote:

"The issue that is limiting is, well, it is your time. Do you have the possibility of traveling to Dallas and talk to some of your friends over there, or colleagues, right, within the same area. Time, travel, yes that is what is making the limits. Because if I have to get involved in say a new circuit which is coming, well, then the prize is time, and if it is sort of demanded that I do something else, which really have to get done, well, then I do not have time for other things. Then I cannot take part in something and commit myself to, well, I will look and that and I will be done with it in say 14 days, if I know, that I cannot say, well, now I will take a week out of my calendar and use it on something else, because I have to do this stuff for the main program which is running" (Engineer)

"Det der begrænser det det er jo, altså, hvad har du af tid. Har du mulighed for at rejse til Dallas og snakke med nogle af dine venner derovre, eller kollegaer ikke også, indenfor samme område. Tid, rejse, ja det er sådan set egentlig det ser sætter begrænsningen. Fordi skal jeg blande mig i f.eks. en ny kreds der er på vej, jamen så koster det noget tid, og hvis det ligesom kræves at jeg laver noget andet, som skal fanme være lavet, jamen så har jeg ikke tid til det andet. Så kan jeg ikke blande mig i et eller andet og committe mig til jamen, det kikker jeg på, og det har jeg klar til om 14 dage eller et eller andet, hvis jeg ikke ved at jeg kan tillade mig at sige, jamen nu tager jeg og rykker en uge ud af min kalender og bruger på det her noget andet, fordi jeg skal altså lave det her til det her hovedprogram som kører." (Engineer)

It is in this vein important to note, that a top manager stated in an interview that he believed that TIDK was not very well connected to other TI sites, quote:

“Manager: To tell you the truth. My opinion very frankly is that Denmark is not really enough connected to TI world wide. Not to France. Not to Dallas. Not to anywhere. I feel that they are, except from the Solution Delivery team, but the rest of the R&D, the real R&D in Denmark is, call it isolated, to some degree. I feel it is partly isolated, yes.

Kristian Hegner Reinau: Does that mean that the engineers just talk to each other and the managers locally, but not the rest of the world.

Manager: Yes, they are not enough connected. That’s what I feel after 6 or 5 months of Denmark. There is a huge lack of networks, I mean the micro networks that usually links Dallas engineers on common subjects of interests to somebody in Denmark or a software department in Dallas, or India, together with somebody in Denmark. I, it’s much too much from manager to manager, and then down again, but there is, there parallel route, path, is missing somehow.”

Instead of developing new knowledge management is focusing on utilizing existing knowledge most efficient. And apparently, the engineers in TIDK have not been good at this previously. An engineer mentioned in an interview that he did not believe that engineers within TIDK was good at talking to each other, quote:

“Sine we are all sitting in Aalborg, then you can of course talk together, but I do not think, even that we are not good enough at. That we can for sure get better at” (Engineer)

“I og med vi sidder i Aalborg alle sammen, så kan man selvfølgelig snakke mere sammen på kryds og tværs, men jeg synes ikke det, selv det er vi ikke gode nok til. Det kan vi helt sikkert blive bedre til.” (Engineer)

He further explained that, quote:

“What I see is that an tendency easy emerge, that you are on that program, you are on that program, you are on that program, and you are in department, well, then you sit inside you own little box and you only talk to those on that program, who you are involved with. It is a dangerous tendency, I hope that with time we can break it, and say, well, talk with. Well now I am sitting with audio in our R&D and another one as come who also have gotten audio, and then we have a customer department where there is an audio man too. Previously the R&D audio guy was sitting in one place and the customer audio man in another. What we have done now, is that we are sitting together, and that is actually something we have done on our own initiative. You can sat that naturally I should sit with the other people working on E-costo, and then I had to talk to them. But I have chosen to say, well, I will rather sit with the audio man from our customer department, because then we can talk about things. Because the E-Costo people, I will talk with them when I need it. But that audio guy, or the customer audio guy, them I do not talk to naturally because we do not make anything together as such. Despite that we both work on audio. So that we are sitting together, and have done that for around a year, instead of actually sitting with your, what should I say, like-minded, well, that means that we have a daily sparring, and create a synergy. So personally I have a goal about breaking down walls, so to say” (Engineer)

“Det jeg kan se der let bliver en tendens til, i og med du er på det program, du er på det program, du er på det program, og du er i den afdeling, jamen så sidder man indenfor din lille kasse og kun snakker med dem man egentlig har noget at gøre med. Det er en farlig tendens, jeg håber at vi med tiden ligesom kan bryde det lidt ned og sige, jamen, snak med. Altså, nu sidder jeg så med audio i vores R&D og der er så kommet en anden der også har fået audio R&D, så har vi en kundeafdeling hvor der også sidder en audio mand. Tidligere sad R&D audio manden et sted, og kunde audio manden et andet sted. Det har vi så gjort nu at vi sidder

sammen, det er noget vi egentlig har gjort på eget initiativ. Hvor man kan sige, naturligt jamen så bude jeg sidde sammen med de andre folk der arbejder på E-costo, og så var det kun dem jeg skulle snakke med. Der har jeg så valgt at sige, jamen jeg vil hellere sidde sammen med ham audio manden fra vores kundeafdeling fordi så kan vi snakke sammen omkring tingene. Fordi de der E-costo folk, dem skal jeg nok få snakket med når jeg har brug for det. Men ham der audio kunde manden, eller kunde audio manden, jamen ham snakker jeg ikke naturligt med, fordi vi har ikke som sådan noget vi lige laver sammen. Ud over at vi begge to arbejder med audio. Så det at vi nu sidder sammen, og har gjort det det sidste års tid, jamen det giver at vi har en daglig sparring, og får en synergi, i stedet for og egentlig sidde sammen med din, hvad skal man sige, ligesindede. Så personligt har jeg da et mål om at bryde nogle mure ned om du vil" (Engineer)

Another engineer explained, that during the growth phase where TIDK grew to around two hundred employees, the number of personal relations he possessed within the company actually stated to fall, and when the size of the company declined around 2007 and 2008 his number of personal relations rose again. When asked about why he had fewer personal relations within TI when there were around 180 employees compared to when there was around 100 he explained:

"Well, it created some more noise, because there are a lot of people sitting and talking. In principle you are right in what you say [THE QUESTION WAS IF THERE WAS NOT MORE RELATIONS IF THERE WERE MORE PEOPLE], but the fact that so many are sitting together, that do make a difference, because you have a more intimate, the ones you talk to, there are fewer interfaces, right. When you are sitting in the cantina, then it is not completely filled. Then there is only two or three tables, right, then there is larger chance that you are talking to the same people. If you add a 100 people, then it is a simple N faculty thing, there are more handshakes, which have to be exchanged, if you are to. Well, from that view, there are fewer interfaces" (Engineer)

"Jamen det skaber alligevel noget mere støj fordi det er jo mange der sidder og snakker. I princippet har du ret i det du siger, men det at man sidder mange sammen, det gør altså en forskel, at du har en lidt mere intimt, dem du snakker, der er færre interfaces altså. Når du sidder ned i kantinen, så er den ikke helt fyldt. Så er der måske kun to eller tre borde ikke, så er der større sandsynlighed for at snakke med de samme folk. Hvis du ligger 100 til, så er det sådan en simpel n fakultets ting, der er flere håndtryk der skal udveksles, hvis man skal. Altså ud fra den betragtning, så er der færre interfaces." (Engineer)

A top manager in TIDK, with a carrier containing both manager positions in both a TI site in Nice and a TI site in Korea explained, explained using TI Nice as comparison:

"Manager: If you go to nice, the first thing that hits you are that half past eight the offices are empty, completely empty, at nine o'clock, you hear the noise. So these guys then they have a different style of communicating in Nice, a lot of communication is informal, not in meetings, we call it coffee machine strategy, these guys are talking to each other, very often with a coffee, and this is how the day starts at 9. Communication in Denmark is completely different. It's partly lacking. So people do not talk to each other about the interesting topics, many things need to be enforced by management; this is not something you need to do in Nice.

Kristian Hegner Reinau: You say they don't talk about the interesting topics, what

Manager: For instance reuse. Management set up project A, B, C, you allocate engineer A B C to each of the programs, they do sometimes work on even similar solutions, this one have a problem, this one have a problem, both detect the same independently, not talking to each other. Both have the similar problem but they do no comparison. It is for me as a manager, this is a disaster. I can save one guy. I stop this one to work on it, I continue this one, this does something else in between at the same time. You know, if manager need to control this level of, I call it micromanagement, then you are really busy as a manager, because its, the machine need to run efficiently by itself. If you do the micro management I feel it's the most

ineffective organization you will have. So in Nice this is much easier, because these guys they meet by the coffee then they talk about politics, about management stuff, they talk about their daily work, so it is more informal. In Denmark this type of things pop up in official meetings, reviews for instance. So you invite the RF department every four weeks and suddenly you compare stuff, compare it and then ups, interesting, have you talked to each other, no, does it make sense, yes. Everybody agrees, of course, and then, I mean, that's too lazy in my eyes, you know."

The manager hits on two interesting point in this, the lacking interest in political games and strategy among TIDK engineers and the attitude of TIDK engineers towards talking to each other. Taking the last point first, one engineer explained in an interview, that the competence group he had been part of died out, but he could not really tell why, but that in his eyes time pressure was not really the reason, quote:

"Engineer: Well often, then there are people complaining, but we don't have time, and blah blah, but it, in my opinion, then that is not so much the issue. It is more, it is in a way up to the people themselves. I just thing in general, that we are not so good at it. Well, our group has died out a bit. I was in a analog baseband competence group, it is like, you do not really pull yourself together to deliver much constructive work.

Kristian Hegner Reinau: Do you have any ideas about what to do if it should work, what should be done different.

Engineer: Se, if I knew that, then I would do something about it. Yes, I actually think that management here did what they could, because officially we was allowed to use, I think it was something like 10 or 20 percent of our time on this, for promoting knowledge sharing simply, but people don't get around to do it, well I don't do it myself either, well in the start there I had a couple of things I was working at, but have not, well, I dies out a bit"

"Engineer: jamen, tit så er det jo folk der klager over, jamen vi har ikke tid, og bla bla, men det, efter min mening, så er det ikke så meget det. Det er mere, det er sådan lidt op til folk selv. Jeg tror bare generelt, vi er ikke så gode til det. Altså vores gruppe den er død lidt ud. Jeg var med i en analog baseband kompetencegruppe, det er som om man får ikke lige taget sig sammen til ligesom at byde ind med ret meget konstruktivt.

Kristian Hegner Reinau: Har du nogle ideer hvad der skulle til hvis det skulle fungere, hvad skulle man gøre anderledes.

Engineer: Se hvis jeg viste det, så ville jeg også gøre noget ved det. Ja, altså jeg synes faktisk ledelsen her, de gjorde egentlig hvad de kunne, fordi vi har egentlig officielt fået lov til at bruge, jeg tror det var op imod 10 eller 20% af vores tid vi måtte bruge på det her, til at fremme vidensdeling simpelthen, men folk får det ikke gjort altså, jeg gør det da selv heller ikke, altså i starten, jo der havde jeg et par ting jeg sådan arbejdede lidt med, men så har jeg ikke sådan, pyh, ja, så dør det lidt ud."

The interview draws a picture of a group of engineers in TIDK who are under pressure which makes it difficult for them to use time to develop new competences and do networking. Given this the word "laziness" is maybe a wrong word to use when describing the attitude of the engineers towards networking and their actions in the competence groups. Interview draws a picture of a group of engineers under a high work pressure, and possibly the consequence of this pressure is, that when they are given time to build new competences and do networking within their time schedules, for example in the competence groups, then they do not have the sufficient energy left to keep up a high activity level in this task also. As one engineers stated in an interview , quote:

"Manager: ... but you can sometime burn out in all the information that some. And maybe burn out a little sometimes.

Kristian Hegner Reinau: Ok what makes you burn out, is it

Manager: It could, if you have to many projects running at the same time and you have to reach it all in time, then there simply are times where you have to say stop, now it is not working anymore, now we have to relax a bit for a while."

Manager: ... men man kan godt nogle gange gå kold i al den information der kommer. Og måske brænde lidt ud engang imellem.

K: Ok hvad gør at man brænder ud, er det

Manager: Det kunne, hvis man nu har alt for mange projekter kørende samtidig og man skal nå det hele, så er der simpelthen nogle gange man må sige stop, nu går den ikke længere, nu må vi lige slappe af et stykke tid.

Turning to the second point, interviews show that some managers in TIDK felt that political games within TI were a waste of time for them, which will be discussed later. This attitude towards political games among engineers as well as managers had a consequence for the position of TIDK within TI. The Crystal reorganization formalized the organization within TI as a whole and within TI sites. However, it did not mean that the place of TIDK within TI, i.e. the work tasks of TIDK, clear. On the contrary, the place of TIDK within TI has become more unclear through time as a result of technological changes, changes in the market as well as political games about work tasks within TI. And the interview draws a picture of a group of managers who in retrospect believe that they had not stood firmly enough on their own strategies in the political game with other TI sites with TI, and that this was partly the reason for TIDK being in the position where it was by the end of 2008. Let us therefore focus on the political games TIDK has been involved in.

Before doing this, it is necessary to mention in relation to the previous quote, that some engineers, who utilize informal relations in their work to obtain information and influence processes within TI shared the view of this manager that micromanagement is ineffective, as an engineer explained:

"I think that the informal channels are incredibly important because the official program, or the formal program, cannot handle all these details [KNOWLEDGE HE CAN RECEIVE THROUGH INFORMAL CHANNELS], and it should not. But the problem can be if the official program it becomes so controlling that you almost dictate what people should do, because then you strangle, what should one say, not the interdisciplinary, it is not interdisciplinary, it is the same discipline, but inter site communication" (Engineer)

"Der tror jeg at de der uformelle kanaler er utroligt vigtige fordi det officielle program, eller formelle program, kan ikke tage sig af alle de her detaljer, og det skal det heller ikke. Men problemet kan være med den officielle plan, at hvis den bliver så styrende at du stort set dikterer folk hvad det er du skal lave, jamen så kvæler du også, hvad skal man sige, jeg vil ikke kalde det tværfagligt, for det er ikke tværfagligt, det er det samme fag, men tvær site kommunikation." (Engineer)

7 Political games

Over time TIDK has been involved in multiple political struggles because all the sites within TI are competing for tasks. What put TIDK in the line of fire within TI, so to say, was its initial success within TI in the early years. In the early years TIDK was producing reference designs for the

customers, and TIDK had the right to choose which components that would go into the designs. This coupled with some successful projects made TIDK visible both within TI and among TI's customers. As one manager from TIDK told, quote:

"I think that the way I see it is, that actually this unit here in Denmark [TIDK] it had an immense success. And him, we had a Frenchman, who were x-padded here for around 3 years, and he, I don't know how to describe his position, but he, seen from the outside, both internally in TI and also from a part of our customers, they saw him as the public image. It was [NAME] who were the CEO here, but [NAME_FRENCHMAN] he came with an salesman background from TI, and he really managed to promote both the reference design concept, himself, and the place here [TIDK] in a way so that people really thought this was a giant success and we got a heck load of customers in and so. So it wasn't just something one said, it was reality. But that does also have a side effect in such a large corporation, and that is that there are people sitting different places who get envious and think, hmm we want a piece of the cake too. And I think I saw that rather early, that some people began different initiatives. It was most clear with our [TI's] site in San Diego, which was also a company which was brought by TI. Because it had been quite clear that we should do reference designs for UMTS and so, well we had the whole reference expertise, and a UMTS phone is also a mobile phone so a lot of our system expertise was still valid. Of course there were some new things we had to learn, but the amount of things we had to learn was a lot less compared to what they had to learn over there. But they tried really hard to get through with it, and depending on how you see it, well, I think if we are to call a spade a spade, then they tried competing with us. Luckily they couldn't do so [the interviewee laughs], but they tried" (Manager)

Exactly what characterizes a task worth competing for in this game is unclear, and it management and engineers can have different values. Sometime a task the engineers believe that TIDK should fight to obtain is not a task the management believes TIDK should fight to obtain. A manager gave an example on this situation, quote:

"The engineers like to sit and do the details relating to the radio in the phone. But if we look 4 to 5 years ahead then maybe the radio is just one liquorice which is placed on the board and then that's it. Then there is not design surrounding it any more, it is, the chip is done, and it can do it all by itself. And then it is not worth much that we develop a lot of competences in that area in which there will be no work in 4 or 5 years from now." (Manager)

"Ingeniørerne vil gerne sidde og lave detaljerne omkring radioen i telefonen, men hvis vi kigger 4-5 år frem kan det være at radioen det er bare lige en lakrids der bliver sat i, og så er det det. Så er der ikke noget design omkring den længere, det er, hele chippen den er færdigdesignet den kan det hele selv, så er det jo ikke meget ved at vi opbygger en masse kompetencer i det område. Som der ikke er noget arbejde på om en 4-5 år." (Manager)

TIDK has been involved in many struggles because of the success and the growth of the wireless division within TI. As described the largest changes within the organization within TIDK and the wireless part of TI came around 2004 with the Crystal concept. This does not mean however, that the higher management level within TI, which managers in TIDK have referred to, have been stable in other times. One of the founders of ATL, who went on to becoming a top-manager in TIDK until the end of 2007, where he left TI, told in a interview that he had referred to around 8 different managers in TI outside TIDK in around 8 years, which means that he has on average had a new manager every year. Further, when obtaining a manager position in TI, people are expected to put a personal touch on the position, and hence not just continue "business as usual". The logic behind this is that the market and hence the business are changing so fast, so that TI has to change dynamically to. The different 'personal touches' by different managers in the top level of TI shoved up in interviews conducted. Often interview respondents told something like: then we tried to get this task, but then we got a new manager in [another site] and he believed that... Or: This new manager decided that, so finally it was clear... And so forth.

To understand the political struggles TIDK has been involved in, and also the consequences of these for the engineers we need to focus on the position of TIDK within TI. A position which was clear in the beginning, but over time became unclear, as both TIDK as well as the world that TIDK was part of within TI grew considerably with the organizational changes around 2003-2004. Further it is not easy to locate TIDK precisely, because it through time has had different competences under the same roof, refer to the discussion about hardware and software competences.

Originally TIDK had been making reference designs for mobile phones, but in 2003-2004 focus was expanded to smart-phones. We can here note that the technology has become more complex through time, and more and more focus has been placed upon software and the content part of the phones produced. As one manager explained:

“Let’s look back 10 years ago [Around 1999], when the mobile phone business started to grow. We spent 50 or 60 percent on hardware, it was very hardware centric, modem part was say, all the modem was 90 percent of the overall solution. If you look today in a mobile phone you will recognize that the hardware is effort wise in the range of 20 to 30 percent maximum, and the protocol stack, meaning the modem software is maybe in the range of 30 percent of the overall solution. Meaning what are you doing with the other 50 percent, it’s basically the selling point for the kids.” (Manager)

The business unit within TI making chips for smart phones (OMAP) was merged with the business unit making chip for mobile phones, and the leader of the OMAP unit became the leader of the new business unit. This meant that TIDK had to begin delivering boards for phones of another caliber than they had been used to before. Further, they had to deliver such boards to OMAP people coming from the computer field. These people were used to work with computer boards without GSM radios or other radios. Seen from an engineering viewpoint working with computer boards it is quite different from working with mobile phone boards containing radios. Simply put, and not in engineering terms, computer boards are “either on or off”, either they work or they don’t when you plug a chip into them and turn them on. The situation is different with boards containing radios that have to be calibrated etc. The OMAP people, used to computer boards, was used to that if they needed say 200 test boards the day after the arrival of a new chip, then they could get so. All that was needed was to plug say 200 new chips into 200 pre-prepared and tested boards, and then they were ready to form the basis for software development etc. TIDK was not used to working in this way. Firstly, in the ATL Research time the company seldom delivered more than 25 boards in each roll, but then they normally had to make some spins to get the RF working. Secondly, when the chip arrived it had to be plugged into the boards, calibrated and tested before the boards could be used for software development etc.

Problems therefore emerged because the capabilities found in TIDK regarding the production of boards were not the capabilities needed to fulfill the demands given from the top-level of the business unit. TIDK’s work routines and their corporation with their suppliers were not geared to produce boards quickly. As a manager from TIDK explains:

“The cooperation we had with the suppliers that we used in our production wasn’t geared to produce that fast, not in the least when the RF preferably had to work. So it gave a tremendous amount of trouble and turned our focus to really having to deliver some boards and the ability to deliver, maybe not 200 boards, but it is not unusual that we deliver 150 boards or something like that in the first couple of weeks after the introduction of a new chip. This is because of all the software people waiting for it. But it is obvious that we can’t do that on the same times as having a top quality on the RF. And even also on the computer part that we

also were used to fix during the spins in which we made the RF work, in which we were fixing all the small issues on the digital part. And therefore normally when those boards started rolling out to other people, also internally here in this house, then they were normally in a very good quality. And if the software worked, then you could normally take such a board and measure everything, and you would not find anything being outside the specs. And that we have had to decrease, to fulfill the other thing [DEMAND FOR MANY BOARDS]. And there have also, there have been overshoots at that process, because the high people in TI, they were simply completely BALSTYRISKE about us having to deliver all these boards. And then suddenly there were someone, sitting and ruling over us, who were coming from a completely different world, from a digital world, being used to make computer boards, so they really had trouble understanding why on earth we could not deliver, when they could easily make 200 boards within their own organization. So we went through a really tough process about getting the production up and running and being able to fulfill these demands. And that meant, also the day today, that when you go out and talks to the managers that are running our programs, the still, and especially the last year to year and a half, there we have tried to turn things around again, to get back to where we came from. We have to deliver all these boards, that is not up for discussion. But it is necessary, our production, we have gotten an production department here, and we did not have such earlier, well, people employed in TI but here, a small group of people. They have to manage to produce, and then people on the program has to concentrate on, well of course help them with what they need, but our focus area shall be turned back to having a good quality on the product and designing the right product. It is not just a product for software development, it is a product which have to be a reference design for our customers. We have, because of all these organizational issues, been forced to turn focus away from the place where we came from. And it is a hard fight getting back" (Manager)

"Det samarbejde vi havde med de leverandører som vi brugte til at producere med var ikke gearret til at kunne prodducere så hurtigt, og slet ikke når at RF'en også helst skulle virke. Så det gav en vældig ballade og så drejede det fokus over på at vi skal dælmee kunne levere nogle boards og vi skal kunne lvere de her, måske ikke 200 boards, men det er ikke usædvanligt at vi leverer 150 boards eller noget i den stil indenfor de første to uger af ny en chips kommer ud. Fordi at der sidder så mange softwarefolk og venter på det. Men det er jo klart, det kan vi jo ikke gøre samtidig med at vi har en topkvalitet på RF'en. Og endda også på noget af computer delen var vi jo også vant til, fordi vi var vant til at have de der rul der for at få RF'en til at virke, så alle de der småting der måske var på digital delen, så blev de jo fikset samtidigt. Og derfor de boards der, når de begyndte at rulle ud til andre folk også internt her, så var de normaltvis i en meget meget godt kvalitet. Der var ikke rigtigt nogle blue wires, altså sådan nogle ledninger der er loddet på. Og hvis eller ssoftware duede så kunne du normalt tage sådan et board og så måle det fuldstændigt igennem, og du ville ikke finde noget der var udenfor spec. Og det har vi jo måttet give noget køb på for at opfylde det andet der. Og det har også, der har også været overshoot på den der proces, fordi at de høje herrer i Ti de var simpelthen så fuldstænigt balstyriske over det her med at de skulle have de har boards. O så pludselig var der nogle, de der folk der sad og bestemte over os, de kom jo fra en helt anden verden, de kom fra en digital verden, og var vant til at lave de her computerboards, så de havde meget svært ved at forstå hvofo i alverden, nu når de lavede det internt i deres egen organisation, så kunne de nemt lave 200 boards, hvorfor i alverden kan i ikke det. Så vi var igennem en meget meget hård proces der med at få vores produktion til at køre, til at kunne leve op til de her krav. Og det betød jo så også at den dag i dag, når du går ud og snakker med de managere der leder vores programmer, så stadigvæk, nu her specielt det sidste års tid, til halvanden, der har vi forsøgt at få dem lidt omvendt igen, komme tilbage til der hvor vi kom fra. Vi skal kunne levere alle de boards her, det er altså ikke til diskussion. Men det skal altså, vores produktion, og vi har fået en produktionsafdeling, og sådan noget som vi ikke havde tidligere, altså folk der er ansatte i TI men her, en lille håndfuld folk. De skal altså kunne ændere and få produceret, og vi skal så på programmet kunne koncentrere os om, selvfølgelig at hjælpe dem med hvad de nu skal have, men vores fokus område skal tilbage til at være at vi skal have en god kvalitet på produktet og designe det rigtige produkt. Det er ikke bare et produkt til at udvikle software på, det er altså et produkt her der skal forestille at være et re-

ference design for vores kunder. Så vi er sådan, pga. alt det her organisatoriske blev vi tvungen til at skifte fokus væk fra der hvor vi kom fra. Og det er en hård kamp at komme tilbage.” (Manager)

This is one important political game that has influenced the core competences of TIDK. Another game is a game surrounding the work spilt between TIDK and other TI sites in relation to work in the RF domain. This struggle has been huge, and influenced the core competence TI bought in ATL, so I will discuss that game in a section for itself. However before diving into this story, let us look at the nature of the political games in detail.

7.1 Learning the game

Some managers interviewed said that when they became a manager, they had to learn the political game. One could go so far as to say that some of them seemed to have been surprised by the extent of these games and the resources put into them. Other saw the political games as a natural aspect of being part of a huge multinational corporation:

“...it is a different world to work in a global organization, of course it is, and it demands a different behavior than sitting in a small Danish organization that is an independent Danish organization. And you have to learn how to live with it and then take the measures that makes you advance and get heard.” (Manager)

“...det er en anderledes verden at arbejde i en global organisation, selvfølgelig er det det, og det kræver en anderledes adfærd, end den det gør når man sidder i en lille dansk organisation der er en selvstændig dansk organisation. Og det må man lære at leve med, og så bruge de midler der gør at man kommer frem der, ikke, og blive hørt.” (Manager)

It has been difficult to find a suited word for the “political game” within TI. One top manager saw the “game” as a natural part of the job of being a manager within a multination corporation, and preferred to call it “networking”. Other managers used the term “politics” when interviewed. We could maybe also use the term “strategic negotiation”. I will prefer to use the term “political game” in this chapter. The reason being that some managers, possibly because of them having an engineering background, saw the political games as something annoying. It is striking that some of the managers in the top of TIDK said during interviews, that they did not like the games. One of the top managers in TIDK, described by other employees as an extremely skilled engineer, told when interviewed in the end of 2007, how the company had grown and the political games expanded through time, and how he still was an engineer in his heart:

“We were a small company originally when we entered the wireless division of TI which was also quite small. I think there was about 300, or 250 people or something like that in TI wireless at that time, and we brought in 35 people or so, so it was a very small intimate association. But it has grown and been merged with another division of, what was its name, oh yes it was ours, the one called the OMAP division. So that, I don’t know, well I think we were about at least 4000 people before the cut downs this year. And that is of course a completely different kind of management one has to perform and an incredibly amount of politics in everything. And it has been funny enough to try, but I could just feel that it just wasn’t me, becoming extremely good at the political games and things like that. I am, I my heart, I am an engineer, and I like to get down to the lab and talk to the guys down there. And maybe come up with suggestions as to what they could do and so forth. Look at some experimental results and stuff like that. But during the last three years it has more or less been a yearly visit to the lab. And you have been slogging away like crazy without seeing any tangible results.” (Manager)

“vi var et lille firma oprindeligt og vi kom ind i TI’s wireless division, der også var meget lille. Altså jeg tror der var ca. 300 mænd, eller 250 mænd eller sådan noget, i TI wireless dengang

vi kom ind, og vi kom så ind med 35 mænd eller sådan noget, og det var sådan et meget lille intimt selskab. Men så er det jo groet og groet, og blevet slået sammen med en anden del af, hvad hedder det, ja det var vores, den der hed OMAP divisionen. Sådan så, jeg ved ikke, her før der så skete nogle nedskæringer i år ikke også, jeg tror vi var oppe på mindst 4000 mænd. Og det er jo en hel anden form for ledelse man skal udføre og utroligt meget politik i alting. Og det har jo været sjovt nok ikke også og prøve men jeg kunne bare mærke at det lige om ikke, det var ligesom ikke mig og blive ekstremt god til sådan politisk spil og sådan noget. Jeg er sådan, inde i hjertet, der er jeg ingeniør, og jeg kan godt lide at komme en tur ned i laboratoriet og snakke lidt med gutterne der sidder dernede. Og komme med nogle forslag til hvad de kan gøre og så videre. Kikke på nogle måle resultater og sådan noget. Men de sidste tre år der har det nærmest været årets begivenhed når jeg har været i lab. Og man har, ja, knoklet bare sindssygt derudad, uden at man egentlig kunne rigtigt se nogle håndgribelige resultater" (Manager)

The interesting thing to note here is that the manager sees himself as an engineer in his heart. Political games are not what he lives for doing. One might wonder therefore, what happens when such a manager enters an organization as TI where other managers might come with a business background and hence might be living more for the political games than for the engineering challenges. We should here note, that the Frenchman, who was the driving force behind the promotion of TIDK both within TI and among customers in the early years, had a salesman background and not an engineering background. It is however normal in TIDK that managers have an engineering background and because of the work they do and their involvement with engineers, it is unlikely that managers without an engineering background would be able to do the work.

Networking, or political games so to say, are important for managers as one manager explained the following way:

"There hasn't been a strong hierarchical culture as such in TI at any time. There have been some individuals around the world who have, what to say, make their voice heard and therefore gets through with things. And that is because this is matrix organization in tenth power where you refer to each and every person more or less. So it is not about what your manager or some of your managers say. It is about you creating some influence and being heard." (Manager)

"Der har ikke været på noget tidspunkt en egentlig sådan rigtig stærk hierarkisk kultur i TI. Der har været nogle enkeltpersoner rundt omkring i verden, som, hvad skal man sige, gør deres ting gældende, og dermed kommer igennem med tingene. Og det skyldes at det er jo en matrixorganisation i tiende potens det her, hvor du refererer til gud og hver mand, mere eller mindre. Så det drejer sig om, det er ikke hvad din chef siger, eller hvad nogle af dine chefer siger, det drejer sig om, det er at du kan skabe noget indflydelse og gøre din, altså råbe op, og blive hørt" (Manager)

Networking is important for engineers in as they are able to search for knowledge in these networks. The political games are for managers, not engineers, and managers use their networks in the political games in securing alliances, support for given projects, winning given work tasks etc. Though engineers are not involved in political games, the political games clearly influence them in their everyday work-lives, as one manager explained, quote:

"The game itself is for managers, but it clearly also influence the engineers because there are a lot of situations where it is unclear who we shall go to. They might be asked something, also from the Nice-front or they are to work with somebody from Nice and it is not always clear who should take the lead or who should be in charge and then they get a lot, it is not always clear to them who's in charge and what is the agenda of the day on that front, right. So it gives uncertainty, no doubt about it and there is a great demand to get a clarification of

the goals in this house and how that fits with Nice, no doubt about that, we all do. And that is a tough problem.” (Manager)

”Selve spillet er jo for managers, men det påvirker jo klart ingeniørerne fordi der er jo masser af situationer hvor det er uklart for dem hvem er det vi skal gå til. De bliver måske bedt om noget også fra Nice fronten af eller de skal arbejde sammen med nogle fra Nice, og det er uklart hvem der skal tage teten, eller hvem der skal bestemme, så de får jo en masse, det er ikke klart for dem altid hvem der egentlig skal stå for dem, hvem der bestemmer for det, hvad er dagen agenda på den front som der nu er, ikke også. Så det giver da usikkerhed, ingen tvivl om det, og de efterspørger meget at vi får en klar afklaring af hvad er det vi vil her i huset og hvordan passer det i forhold til Nice, ingen tvivl om det, altså det gør vi sådan set alle sammen. Og det er en hård problematic.” (Manager)

Another manager gave a similar description of the consequences:

”... and sometimes, not on manager-level but at engineer level, the engineers will feel that the blinds are a bit shut and it is difficult to get information. If you are dealing with a task it might be difficult to comprehend why the information is not accessible. But it might go up higher on manager-level or maybe also on a middle manager level where there is no openness for sharing of information. But there is also the other aspect of ordinary confusion. Maybe somebody has information and nobody knows about it and has a link to. That's also a disaster. The openness you know, somebody is doing a fantastic piece of work, development work, but the link is missing so we e.g. can't see it on the internal network or something like that, right.” (Manager)

”... nogle gange vil vore ingeniører altså på ikke manager niveau, men på ingeniør niveau, de vil føle at nogle gange vil skodderne måske være lidt lukkede for at få noget information. Hvis man sidder og har en opgave ikke, og det kan være man sidder, det kan jeg ikke forstå, hvorfor kan jeg ikke få den information ikke. Men det kan jo rippe lidt længere op, op på et manager niveau, det kan måske være et mellemleder niveau hvor der ikke rigtigt er et, hvad skal man sige, en åbenhed ikke også, i at dele information. Men der kan også, et andet aspekt, det kan også være ganske almindeligt forvirring om at der er nogle der sidder med noget information som ingen aner en kæft om, har en link til, det er jo også en katastrofe. Altså den der åbenhed, ikke, på at der er nogle der egentlig har siddet og lavet et fantastisk stykke arbejde, udviklingsarbejde, men linken misser f.eks. til at vi kan se den et eller andet sted på vores interne netværk og sådan noget ikke.” (Manager)

In a similar vein one engineer explained in an interview that he felt it was unsatisfying that he often did not get arguments for why he should do different things, using the following example:

”E.g. I have currently had, or rather been involved in a small problem, a little thing, with having a signal in serial on which we shall put a resistance of a specific value, say 156 kilo ohm to be concrete. It's a fairly unstandardized value that is not to be found amongst the normal values of resistance. And then you ask, well okay, does it need to be 156 kilo ohm or could we use 150 or 160 or we could say that we took 154 or 158 because they exist in another standard series. So you get an answer that yes, you can use 154 or 156, well okay. It was something like, sounds like there is no problem if you use 154 or 156, whatever, instead of giving an argument why we have these tolerances and that is why you should use the resistance and it should stay there within. Well, then you have an understanding of the problem and might be able to give the customer when arriving, an argument for the value instead of well, they say that it is okay by this value.” (Engineer)

”Der var f.eks., lige for tiden der har jeg sådan en lille, eller har lige været blandet ind i et lille problem, meget bagatel artigt, med at i serie med et eller andet signal, der skal vi have sat en modstand på en eller anden specifik værdi, 156 kilo ohm, for at være konkret, det er sådan en rimelig ustandardiseret værdi, der ikke lige sådan findes i de normale modstandsværdier, så spørger man lidt til, ok behøver det nu godt nok at være 156 kilo, kan vi ikke bruge 150 el-

ler 160, vi kan også godt gå hen og sige at vi tager 154 eller 158, fordi de findes i en anden standard serie, så får man så et svar at, ja, jo, du kan da godt bruge 154 eller 156, nå ok. Der stod sådan en eller anden, sounds to like there is no problem if you use 154 eller 156, whatever, istedet for sådan ligesom at komme med en begrundelse for at vi har de her tolerancer indenfor det der, og det er derfor du skal have modstanden, og den skal så holde sig der indenfor og nå ja, ok, så har man ligesom en forståelse for problemet, så man når kunden måske engang spørger, jamen så kan man argumentere for hvorfor man har den her værdi i stedet for, jamen ok, de siger det er ok med den værdi der." (Engineer)

Is necessary to mention that some of the confrontations within TI are the consequence of different worldviews between different TI sites rather than disagreements. One engineer gave the following example.

"It's a game or that is, I don't see it as a political game, nobody is against each other. But it is rather that when people don't talk then an attitude or a feeling is created and they have a picture there, we have a second picture in Denmark, a third in India and a fourth in France. And the less one talks, the more different those pictures get. And the more we talks, the more similar the pictures get. And that is why I see, that if we don't have anything which formally states in our procedure and organization that we have to talk. So that is why we get different pictures automatically." (Engineer)

"Det er et spil der kører, eller dvs. jeg ser det ikke som et politisk spil, det er ikke nogen som ligesom er imod hinanden. Men det er nok nærmere at hvis folk ikke snakker sammen, jamen, så bliver der en holdning, eller fornemmelse et sted, så har de et billede der, vi har et andet billede i Danmark, der er et tredje billede i Indien og et fjerde i Frankrig. Og jo mindre man snakker sammen, jo mere forskellige bliver de billeder. Og jo mere vi snakker sammen, jo mere ens bliver de billeder. Og det er der hvor jeg ser, at hvis vi ikke har nogen, altså der er ikke nogen formelle ting i vores procedurer og organisation som siger at vi skal snakke sammen. Så derfor så får vi automatisk forskellige billeder." (Engineer)

Apparently some of such misunderstands originated in different cultures among TI sites, an issue I shall return to later. Let us now turn to the nature of the political games, it

7.2 The arguments

TI is a technical firm, and therefore technicalities are often the core arguments in the games. One manager explained:

"Due to the fact that we are a technical company, then focus is also on the technique. So therefore, you always have to know where the people you ask, have their focus. What issues that are important for them, and then turn the questions in that direction. As you said yourself it is very important that we do something about this and that, therefore I have decided that we do this and this, so will you help with that?"

"...i og med at det er en teknisk virksomhed, så ligger fokussen også på teknikken, så derfor, skal man når man spørger nogen, hele tiden være opmærksom på hvor ligger deres fokus henne. Hvad er det for nogle ting der er vigtige for dem, og så dreje spørgsmålene over i retning af at som du jo selv har sagt er det meget vigtigt at vi gør noget ved det og det, derfor har jeg bestemt at vi gør sådan og sådan, vil du hjælpe med det?" (Manager)

Another manager gave an example regarding the effort spent by TIDK in promoting the use of form factor designs within TI:

"... then the political work starts with you having to convince people, and you have to keep on mentioning it in all the circumstances, all those that are out traveling from management in Denmark, and when people get visitors and such things, we have to put it into our slides for when we show something, that one way to solve this issue, that could be this way. And

that political work on, lobby work on working up this momentum and then suddenly it tips over...

... and then it came from the top that we should do this, which we in reality have been working on that we want to do for a longer time" (Manager)

"...så går det politiske arbejde i gang, med at man skal overbevise den ene og den anden, og man skal blive ved med at nævne det i alle de sammenhænge, alle dem der er ude og rejse fra ledelsen her i Danmark, og når folk er på besøg og sådan noget, vi skal putte det ind i vores slides til når vi viser noget, at en måde at løse det her på, det kunne være den måde. Og det der politiske arbejde med og, lobby arbejdet med at oparbejde det her momentum med at pludselig så tipper den over...

...og så kom det ovenfra at vi skulle gøre det, som man i virkeligheden har arbejdet på at vi gerne ville gøre i længere tid" (Manager)

A third manager gave a similar example about the value of spreading information within TI, not always through formal communications channels, to gather momentum for a given ideas, quote:

"Manager:... there more we are able to tell, that we have to test the chip on some cheaper types of PCBs, the better a understand the chip designers get, that this is the right way to go.

Kristian Hegner Reinau: How did this report [REPORT ON THE ISSUE] emerge, is it your manager that brings it further or is it you who send it to managers and engineers

Manager: We send it to engineers and the managers of the engineer, and it is about getting is spread as much as possible, to so many people, that nobody can shelve it.

Kristian Hegner Reinau: Ok, so it is not something that runs according to official channels

Manager: No it is not, sometimes you have to cheat, and bypass.

Kristian Hegner Reinau: Is that something that has developed through time, something you have learned through time

Manager: It is something we have learned underway

Kristian Hegner Reinau: How did it function earlier.

Manager: There we were sometimes almost run over in the decision processes because we did not know the organization and how it worked. But we have become much better at that"

"Manager: ... Jo mere vi får fortalt, at vi er nødt til at teste chippen på nogle billigere typer print, jo bedre forståelse får chip designeren for at det er altså den rigtige vej.

Kristian Hegner Reinau: Hvordan kom den rapport [REPORT ON THE ISSUE] ud af det, er det jeres chef der tager en med videre eller er det jer der sender den til chefen eller til ingeniører

Manager: Vi sender den til ingeniører og ingeniørernes chefer, og det gælder om at få spredt det så meget så muligt, og til så mange, at der ikke er nogen der kan komme til at sylte den.

Kristian Hegner Reinau: Ok, så det er ikke noget der kører efter officielle kanaler op i

Manager: Nej det er det ikke, man er nødt til at nogle gange at snyde, og gå udenomkring.

Kristian Hegner Reinau: Er det noget der har udviklet sig undervejs, noget i har lært undervejs

Manager: Det er noget vi har lært undervejs.

Kristian Hegner Reinau: Hvordan foregik det tidligere

Manager: Der blev vi jo næsten kørt over nogle gange i de der beslutningsprocesser, fordi vi ikke kendte organisationen og hvordan den arbejdede. Men det er vi blevet meget bedre til."

A forth manager told the following when asked about the arguments used in the political games:

"Manager: The worst thing you can do is to stand up and say that I am smarter than you. Head under your arm does not lead anyway. So what is very important is to get a sober and calm, what should one say, yes talk about what the issue is. You say that you do this down at your place, and you can do it better than us, right, well, then let us get some facts on the table. And then it is important that you reach some realizations, right. Maybe we have to reach some realizations here, but it can also be that we can see, well, listen to this, we have the argument why we should do these things because we have the competences, right, and that is the whole communication game. This means that you can be unlucky and there is sitting someone who is, excuse me the saying, stiff by nature, and won't give in, and then you have a challenge right. But then my personal attitude come is, and that is that you have to be open, and you have to be sharp. If you are open and sharp, well sharp means that you realize some things but that you also are able to formulate you standpoint clearly, on the technical level, with a connection to the commercial area, well, then you add value in the organization. Then you are working to lift the company, do you follow me.

Kristian Hegner Reinau: yes

Manager: But it takes a lot of time."

"Manager: Det værste man kan gøre det er at stille sig op og sige jeg er klogere end dig. Hovedet under armen fører ingen vejene hen. Så det der er meget meget vigtigt det er at få en sober nøgtern, hvad skal man sige, ja først samtale omkring hvad handler det om. Du siger at i gør noget nede ved jer som i kan gøre bedre end os, ikke også, jamen så få facts på bordet. Og så er det jo vigtigt at man kommer til nogle erkendelser ikke. Det kan være vi skal komme til nogle erkendelser her, men det kan ogs godt være at vi kan se, jamen hør nu her, vi har argumentet for at vi skal lave de ting her fordi at vores kompetencer er her ikke, og det er jo hele kommunikationsspillet i det.

Dvs. man kan jo være uheldig at der sidder en manager som måske er lidt, undskyld udtrykket, stiv at natur, og ikke vil give sig, så har man en udfordring ikke. Men så kommer igen min personlige holdning til det, det er at man skal være åben, og man skal være skarp. Hvis man er åben og skarp, altså skarp dvs. at man selv erkender nogle ting men også selv kan klart formulere ens ståsted altså, på det tekniske område, med en kobling til det kommercielle ikke, jamen så adderer man jo værdi i organisationen ikke, så arbejder man for firmaet og ikke for siten her, ikke også. Så arbejder man jo for at løfte firmaet ikke, kan du følge mig,

Kristian Hegner Reinau: Ja

Manager: Men det går der meget tid med"

What is interesting with this argument is that he, in line with the previous quotes underscores the technical arguments and their value. But what more, he, and this is possibly due to his position in a part of the Solution Delivery organization underscore the commercial arguments, i.e. economical arguments. An engineer gave another example of how economical issues could be used as an argument, quote:

"Well, it is for example if there are some tasks like, we have some audio tuning. We have a lab down here, a hardware lab. And when you have thrown many millions into such things, then

it becomes a bit more difficult for at top manager to say, well that we by the way have to move somewhere else. It will become very expensive at least. And because the competences to make the tasks they do not necessarily move with the lab, so that it what I mean by making yourself indispensable, and place yourself on the court and play the game. Because if you just stand and say, well, we can do this, you have to make a trick, a little" (Engineer)

"Jamen det er f.eks. hvis der er nogle opgaver, som, vi har noget audio tuning, vi har et lab hernede, vi har nogle, vi har et hardware lab, altså når man først har smidt mange millioner kroner i sådan noget der, så bliver det lidt svære for en top manager at sige, jamen det der, det skal vi for øvrigt flytte et andet sted hen. Det bliver i hvert fald meget dyre. Også fordi at kompetencerne til at gøre det de flytter ikke nødvendigvis med hvis man flytter det, så, så det er det jeg mener med at gøre sig uundværlig, og stille sig ind på banen og spille med. Fordi hvis man bare står og siger jamen vi kan også det vi kan også det, man er nødt til at kuppe det lidt her." (Engineer)

That technical issues often becomes the core in arguments does not mean that the better technical argument necessarily win. This is where power relations enter the scene. As the manager comment above shows, it is about convincing people that, say form factor designs are the preferable solution, and hence building support for this view until this prevails within the organization. The core is in other words to change the power relations within the organization using amongst other technical arguments and presenting them time and time again. Other times it is not possible to change power relations. An engineer explained in an interview, that even though TIDK had to review given chips etc. then often decision was taken outside TIDK without the engineers having any opportunity to influence them in reality:

"Well in reality are we, according to our large procedure etc., then we have to get in and review and approve the new specifications. The problem just is, that if we read these specification and say, well there are something here which we should do different, then typically the message will be, well it has been cleared with this big customer, which could be [NAME OF HANDSET PRODUCER], so therefore it has to be like that. And then we can say, well this is not smart. No, but that's the way it is. And it cannot be changed, because it is to late now anyway. And then the outcome typically is that we approve it and say, well ok, someone else have thought about it and are controlling it. So one can say that we have some rules and procedures saying that we can go in and review, and in worst case lay down a veto, but the, well, everyday life shows something else. That we get, when we get to the review, then it is always in the last moment, and the approval work, and the possibility for starting a dialog around something, to find out why it ended up like this, that is very difficult to initiate. What we strive for is to have some informal contact with the people sitting different places in the organization, and talk to the continually, to hear about what goes on, and thereby sit on the sideline. But then the problem is that each of us don't have the necessary bandwidth to do this and also the tasks we are assigned to do. So there are some, due to the fact that we should not do this job according to the organization, then there is not time to do that work. So therefore, officially we are not part of that work, so for me to see that is negative. I know that of course people are working on this, and I hope, well, it is also happening, but it could happen better than it does." (Engineer)

"Jamen i praksis der er vi jo, ifølge vores store procedure osv, så skal vi ind og reviewe og godkende de her nye specifikationer. Problemet er så bare at hvis vi så læser de specifikationer igennem og så siger, jamen der er noget her som bør laves på en anden måde, så vil meldingen typisk være at sige, jamen det er afklaret med den her store kunde, som f.eks. kunne være [NAME OF HANDSET PRODUCER], så derfor skal det være sådan. Og så kan vi sige, jamen det er ikke smart. Nej men sådan er det. Og det kan ikke laves om, for det er alligevel for sent nu. Og så ender det typisk med at så godkender vi og siger ok, så der er nogle andre der har tænkt og der har styr på det. Så man kan sige at vi har godt nogle procedurer og regler om at vi skal kunne gå ind og reviewe, og i værste fald kan nedlægge veto, men den, altså, hverdagen viser noget andet. At vi får, kommer typisk med alt review, jamen så er det altid i

sidste øjeblik, og godkendelsesarbejde, og dvs. at muligheden for ligesom at tage en dialog omkring et eller andet og finde ud af hvorfor er det her blevet sådan her, den er meget svær at slå i gang. Så det vi tilstræber det er at have lidt uformel kontakt med dem der sidder rundt omkring og så snakke løbende med dem, og høre lidt om hvad der foregår og så sidde lidt med på sidelinien. Men der er så det problem at vi hver især ikke har den båndbredde til at kunne gå ind og gøre det ved siden af det som vi egentlig er allokeret til at gøre. Så der er nogle, i og med at vi rent organisatorisk ikke skal lave det stykke arbejde, så er der ikke tid til at lave det stykke arbejde. Så derfor, officielt er vi ikke en del af det arbejde, så det er for mig at se et minus. Jeg ved selvfølgelig der arbejdes på det, og jeg håber da også, altså det sker da også, men det kunne ske bedre end det gør" (Engineer)

The political game has gotten more and more intense in recent years. The top manager saying in the quote above that he was an engineer in his heart later left TI, one of the reasons for this being the extent of the political game, quote:

"That political game within such a huge company, that have been something we have had to learn here. And also something I have had to learn, and that is also one of the reasons why I am leaving TI, that is because now, I have learned quite a lot from that political game, but I actually feel that it is a boring thing to waste your time on." (Manager)

"Det der politiske spil i sådan en stor virksomhed, det har været noget vi skulle lære her. Og også noget jeg skulle lære, og det er så også en af årsagerne til at jeg forlader TI, det er fordi at nu er, jeg har ganske vist lært en hel del af det der politiske spil der, men jeg synes altså det er noget kedeligt at gå og spille sin tid på." (Manager).

Another manager replied the following when asked how the political games had evolved and whether TIDK had found its place within TI in the end of 2008:

"No [TIDK HAS NOT FOUND ITS PLACE]. I will say that the political game has become more and more, what it is called, it is counting more and more, which is the big challenge we are facing. But it is also because the pressures from the customers are changing the whole time. So it I have to give a picture to illustrate it, then you can say that TI is a huge organism, there is a inertia. It is like a supertanker, something happens, well for example [NAME OF HANDSET PRODUCER] send word that they want to do something completely different. Then you start yelling, we have to change course, right, but such a super tanker does not change course just because you yell. It does after several kilometers, first there it starts turning, right. And that political game, it is, I don't think it is optimal for reflecting the picture of the world as it is now. You can also say, that it is a question whether it will ever become that, when you are such a large organization, because our competitors have exactly the same problem. Maybe in some slightly different areas then us, right, but it is basically the same factors they are fighting against. I mean, when you have many engineers, several thousands of people, and you are spread out in different time zones." (Manager)

"Nej[TIDK har ikke fundet sin plads]. Jeg vil sige det politiske spil er blevet mere og mere, hvad hedder det, det vægter mere og mere, det er den store udfordring vi står overfor. Men det er også fordi at presset fra kunderne ændrer sig hele tiden. Så hvis jeg skal give et eller andet billede på det, så kan man sige at TI er en stor organisme, der er en træghed i det. Det er som en supertanker, der sker et eller andet, alt f.eks. [NAME OF HANDSET PRODUCER] melder ud, vi vil noget helt andet. Så råber man op, vi skal ændre kurs, ikke også, og sådan en supertanker den ændrer altså ikke sin kurs fordi man råber. Det gør den jo efter flere kilometer, så begynder den først at dreje, ikke også. Og det er det politiske spil, det er at, mener jeg ikke er optimalt, til sådan set at reflektere verdensbilledet lige nu. Men man kan også sige, at det er så et spørgsmål om det nogensinde kan blive det, når man er så stor en organisation fordi konkurrenterne, vores konkurrenter, har nøjagtigt det samme problem. Måske på nogle lidt andre områder, end vi har ikke også, men det er de samme faktorer man sådan set slås med. Altså når man har mange ingeniører, mange tusinde mand, og man er spredt ud i forskellige tidszoner" (Manager)

Another manager stated in an interview:

"It has become worse [THE POLITICAL GAME] the last couple of years, seen from my chair. Maybe the [NAME OF MANAGER WHO LEFT APROXIMATELY A YEAR EARLIER] taken care of it earlier when he was development director here, then it is just because I have not seen it, I don't know. I don't think so. I think it is because we have gotten a new external CEO in Dallas, where we had one in Nice earlier, and the guy in France, he was a technician, and he did not care much about, well, he was actually well pleased with what he got from here, while the guy we have got in Dallas, he always want to improve, always be better. He is very demanding and does not give way." (Manager)

"Det er blevet noget værre [Det politiske spil] her de sidste par år, set fra min stol. Måske har [NAME OF MANAGER WHO LEFT APROXIMATELY ONE YEAR EARLIER] taget hånd om det tidligere da han egentlig var udviklingsdirektør her, så det bare jeg ikke har set det, det ved jeg ikke. Jeg tror det ikke. Jeg tror fordi vi har fået ny chef for os ekstern i Dallas hvor vi havde en i Nice tidligere, ham i Frankrig, han var sådan, han var meget teknikker og han var også sådan, han gik ikke så meget op i altså, han var egentlig godt tilfreds med det han fik herfra mens han vi har fået i Dallas han vil hele tiden forbedre, hele tiden være bedre. Han er meget pressende og giver ikke ved dørene på noget som helst." (Manager)

Again we can note in the quote that the changes are partly described as being the consequence by a manager change at a higher level and hence a new "personal flavor". It is also worth noting that in the later years which are referred to in the interview are years where the financial situation for TI was getting worse. Making the situation further critical was the global financial crises kicking in some months before the interview was conducted., refer to the discussion in section 4 Therefore the changing attitude at the top-management could be a consequence of a critical financial situation, were it is not feasible to conduct the same work twice etc., though it might secure better technical solution. Refer to the discussion earlier, that one of the top-managers in TI at a time did not care much about the same work being conducted twice in TI because then he knew it was done well. Further, as the quote with the tanker metaphor show, it might be questionable how well a large organization like TI is able to change course in a quickly changing market as the one TI was navigating at the time being.

The development of new competences in the TIDK happens as a part of a political game. Sometimes it is necessary to develop new competences in TIDK so that TIDK can position itself in relation to other sites, as we shall see in the example discussed in section 6.3, in relation to the RF competences found in TIDK and a TI sites in France. Other times it is possible to develop competences in cooperation between TIDK and other TI sites, because the competences are used for different tasks in different sites, as a manager explained:

"Of course [there are cases in TI where people work on the same tasks], there are 40000 people working in TI, I mean, that it would be, it is a standard situation in huge companies, you cannot even, you cannot avoid it completely. But this has nothing to do with, I don't see it really critical for Denmark of course there are overlap in some areas, but as I said, I mean systems get complex and complex, more and more complex, and to draw a clear borderline with a red pen is mission impossible, I mean, there is always the lines like that, and this is reality. Without overlap you cannot get this done really, but of course you can make a work spilt in a clever way, and in a way where you say, ah that really, that's stupid, or creates a lot of redundancy or ineffectiveness. Now developing the same expertise does in my opinion not mean that you work on the same topic. Let's imagine you have a WLAN guy at a site number, I don't know, a site in India, and you have another one working in Dallas, they do not necessarily, they need the expertise, but they do not necessarily exactly the same job. The one is for instance, could develop really system as a sub-system, the WLAN system, while the other guy is working how to integrate this subsystem into a platform. So it is not the same job, but requires the same type of expertise. So it's a different, and then I don't see why this, call it a

mini-joint venture, shouldn't work. I mean both have interests, the same type of goals, the same type of target, to get the system working out to the market, and being sold." (Manager)

Another manager also said that the same work was being conducted different places in TI and explained that it seen from his perspective was both good and bad, quote:

"You will find other organization which makes a product comparable to what we make. And that is very good for something, but also terrible bad. You can say that it is a good that that you are competing internally, the example is that in Dallas they produce some platforms which support these OMAP processors. As I said before, these are the ones that can run ARM9 and Windows systems, which actually overlap with our RDP here. Then you could sit as an administrative CEO or Senior Vice President and say, well, they sit and produce a platform in Aalborg and they sit and produce one in Dallas, there is an overlap, there is no way we can afford that. Because the logical thing to do is to split up the assignment and work efficient. That is an ordinary engineering view upon things. But there is just the issue in it, that in a large organization such as TI, or any other giant company for that matter, there have to be room for internal competition. Because it helps developing the company. It means that you always have to be on your toes to, well not so much in regard to the customers, we have to follow the customers, we all have to do that, but to make sure that we don't become too static in our thoughts. And then we are back with what I do. I have the window where there is as much a view to the outside as to the inside of this house. Because we cannot sit here in Aalborg and believe that we can close the doors, and then sit with our own competences, and then claim that this is what we do, and this we will continue to do for the next ten years. If that happens, if you act like that, in such a multinational company, well, then you risk having to close the site because it cannot cooperate." (Manager)

"Du vil finde andre organisationer som laver tilsvarende produkt som vi gør her. Og det er meget godt for noget, men det er også frygelig skidt. Man kan sige det er godt at man internt konkurrerer, eksemplet det er at i Dallas der laver de nogle platforme som understøtter de her omap processorer. Som jeg talte om før, det er dem der kan køre arm9 og windows systemer, som egentlig overlapper vores RDP her. Så kunne man jo så sidde der som administrerende direktør eller senior vice præsident og sige, hmm, de sidder og laver en platform i Aalborg og de sidder og laver en i Dallas, der er et overlap der, det har vi eddermanne ikke råd til. Altså for de logiske det er at man splitter opgaven ud og arbejder effektivt. Har nogle effektive grænseflader. Det er sådan en almindelig ingeniørmæssig betragtning. Men der er bare lige det aspekt i, at i sådan en stor organisation som TI, eller for den sags skyld du kunne sige et andet kæmpe firma, der skal der være plads til intern konkurrence. Fordi det er med til at udvikle firmaet. Dvs. vi skal hele tiden være oppe på dupperne for at, ikke så meget at vores kunder gør noget, altså kunderne skal vi følge, det skal vi alle sammen, men at vi ikke bliver for statiske i vores tankegang. Og så er det vi afspejler igen til hvad er det jeg laver, jeg har vinduet hvor det er ligeså meget åbent udadtil som indadtil i huset her. Fordi vi kan ikke side her i Aalborg og tro at vi kan lukke dørene her, og så sidde med vores egen kompetence, og så bare claim det her det kører vi venner, og det bliver vi ved med de næste 10 år. Hvis det sker, hvis man opfører sig sådan, i sådan et multinationalt firma ikke, jamen så kan du risikere at siden bliver nødt til at lukke, ikke, fordi at den ikke kan samarbejde." (Manager)

There are also gaps in TI consisting of tasks that should be done, but nobody wants to do, quote:

"Manager: Then having your people behind you [as a manager] you also know what you can do with your peers, to say, look there is this where we are strong, this is where the people are on and you have this, how does this, where is the gap, and very often we have gaps, nobody wants to touch it,

Kristian Hegner Reinau: Why

Manager: Because it is a lot of effort, I mean, you go risk, you sign responsible for something you cannot do,

Kristian Hegner Reinau. So could that both be, you say what you can't do, but also what people would rather not do compared to something else, I mean there must be more fun parts than other parts of the phone to make

Manager: Yes of course, I mean there are several aspects. First of all, everybody tries of course to look at the fun parts, first, true. But even if we look only at the fun parts, you look at your resources and say hmm, sorry, I don't sign up for it. I miss 20 people to really cover it. To do it in the safe way. That's why I know there is a gap, but I will not fill it given the circumstances. We know that we need to fill it, but lets make the next level manager in the rear, this is the part of the work we have difficulties to complete, given what the situation looks like today. And of course management can say we need to close it, you find a solution, I don't care how you do it, it is one of the possibilities, or to say ok we outsource it and to pay, or to say we and some resources, either in Denmark or elsewhere in the world, to cover it, but first there are gaps, nobody really wants to fill on a volunteer space."

To understand how the political game within TI functions let us now take an example and focus on the political game surrounding the work split in the RF domain within TI.

7.3 The tension between TIDK and TI Nice

As discussed earlier, ATL Research was acquired by TI exactly because of the RF competences. So at that time TIDK played center court in the RF work within TI to use a metaphor. This has changed so that today the position of TIDK has become more peripheral. A manager told that today some people in TIDK feel that a TI site located in Sophia Antipolis near Nice in France, from here called TI Nice, stole one of TIDKs main work tasks quote:

"Some people in this house does sort of feel that the team in Nice, have stolen some of the tasks we had originally" (Manager)

"Nogle her i huset føler egentlig at det team der er i Nice de har hugget nogle af de opgaver vi oprindeligt havde" (Manager)

The manager of the RF group in TIDK explains:

"Manager... for RF there has always been a sort of sister group in Nice, as long as we have been in TI. The group down there should originally validate the chipset, and make sure it was alright, and this means that it was a lot of spot testing, whereas we took, one can say, the platform development, and had our boards, the RDP, and they typically had a small RF board upon which they tested the radio chip. And the development in relation to that, it has changed a lot, and now they are in charge of the system specification, and they would like to be in charge of the system validation too, which we actually felt was our field, and that has given a lot of conflicts through time. Or I do not know about the term conflicts, but definitely been as source of irritation here in Denmark especially, where people felt that it has been approved from higher place, that they just have taken areas we actually were in charge of. Perhaps we have been too bad as Danes to say, that this is actually our area, and we want to, well, you should not interfere with it. I think there is a huge cultural difference there, which means that maybe we are not so good at setting the tone.

Kristian Hegner Reinau: Can you try to give some examples.

Manager: Well often it has hit us from behind, we have been surprised that now suddenly they want to do this, and now they want to do that, so it. So when we made an organization change when [NAME OF VICE PRESIDENT IN TI] came, and we got [NAME OF TOP MANGER IN TI] as CEO, well, suddenly a new charter came from this system group, which we had not seen before, but which largely described what we were doing here. Definitely for system, or on the validation site, and that we were very surprised by, and we were not on the organization charter, and we pointed this out, and then it was said, well, no, it is too late now, we can-

not change it. And it is possible that our manager at the time had not been following it closely enough, but that has actually meant, that people were completely confused about what we were doing here, because suddenly the system group in Nice actually had almost the same responsibility as we had, except that it was still clear that we were making the board, but everything else was sort of their responsibility. And that has been extremely confusion to watch that happen. So we have tried several times to talk to them about how the work split should be, and there I think, that probably we have not been good enough there either. They are extremely talented in standing on what they want, and I think that we are maybe a bit to focus on making things work together. I think that maybe we should have been much harder and said, that we will simply not accept, and that we are simply not good enough at doing."

"Manager: ...For RF har der hele tiden været en form for søstergruppe i Nice, så længe som vi har været i TI. Gruppen dernede skulle oprindeligt sørge for at validere chipsettet, og tjekke at det var i orden, og dvs. det var meget spot testing, hvor vi så ligesom tog, kan man sige, platformudviklingen, og havde vores board, RDP'en, så havde de så også typisk et lille RF board hvor de testede radiochippet på. Og udviklingen i forhold til den, den har så ændret sig meget i forhold til at de står både for system specifikationen, men også vil gerne stå for system valideringen, som vi egentlig synes var vores område, og det har da givet mange konflikter hen over tid at. Eller jeg ved ikke konflikter, men i hvert fald irritationsmomenter her i Danmark specielt, hvor man føler at man har tilladt fra højre sted at de bare har taget områder som vi egentlig stod for. Vi har så måske også været for dårlige som danskere til at sige, at det her det er altså vores område, det vil vi, og det skal i ikke blande jer i. Jeg tror der er meget stor kulturel forskel der som gør at vi måske ikke er så gode til at kridte stregen op engang imellem.

Kristian Regner Reinau: Kan du prøve at give nogle eksempler

Manager: jamen ofte er det kommet sådan lidt bag på, vi er blevet overrasket over at nu vil de lige pludselig det, og nu vil de lige pludselig det, så det. Så da vi lavede organisationsændringen da [NAME OF VICE PRESIDENT IN TI] kom til, og vi fik [NAME OF TOP MANGER IN TI] som chef, jamen der kom der lige pludselig et nyt charter for den her system gruppe, som vi ikke havde set noget til, set før, men som stort set beskrev det vi lavede her. I hvert fald for system, eller på valideringssiden, og det blev vi meget overraskede over, og vi var ikke med på organisations chartered, og vi påpegede det, og så blev der sagt, jamen, nej, det er for sent nu, det kan vi ikke nå at ændre. Og det er muligt at vores direktør på det tidspunkt ikke har siddet nok i haserne på den der, men det har sådan set gjort, at folk var totalt forvirrede over hvad det var vi lavede her, for pludselig så stod systemgruppen i Nice egentlig med næsten det samme ansvar som vi havde, bort set fra at det er stadig klart at vi skal lave boarded, men alt andet står de ligesom for. Og det har været enormt frustrerende at se det ske. Så har vi prøvet at sakke med dem i flere omgange om hvordan worksplittet skal være, og der tror jeg, der har vi nok heller ikke været dygtige nok tror jeg ikke. De er meget dygtige til at stå på det de vil have, og jeg tror vi måske går lidt for meget efter at få tingene til at fungere sammen. Jeg tror måske vi engang imellem skulle have været meget hårdere og sagt det der, det vil vi simpelthen ikke acceptere, og det er vi bare ikke gode nok til."

The manager further explained that he believed that this outcome had something to do with the Danish culture in comparison with the French culture in TI Nice, as he also stated in the quote above. That TIDK people had not stood firmly enough on their tasks and wishes for further tasks.

What we should note here is, that we here see and technical company, ATL Research, being acquired by TI, and the employees hence thrown into political games within this organization. This means that managers in TIDK need to learn the games as discussed earlier, and the culture of the people, managers and engineers in relation to these political games, becomes important to. One could think that ATL Research was acquired by a American corporation, and therefore it would be the clash between American work culture and Danish/north-Jutland work culture that would be the issue. Of course this class exists, but actually the clash between Danish/north-Jutland

work culture and French work culture seems to have played a larger role. This is because TI Nice is relatively big TI site and the center of TI in Europe and because TI Nice has been the main advisory in the political game surrounding the RF competence. I shall therefore focus on the issue of culture in detail in section 8.

TIDK is a geographically remote site compared to Nice TIDK, and therefore access to information and the political games taking place in TI Nice can be difficult to obtain for people in TIDK. A manager told the following in an interview:

"Sometimes we are not prepared for the stuff coming, because it is something taking place in the corridors in Nice. Nice is ten times bigger than Denmark, so of course there is quite an amount of things going on down there, and there is also some information floating, which we do not necessarily discover in Denmark, because we are not there. In reality I have several times thought about whether we should have a, not a spy, but a stationed worker in Nice who could collect information down there." (Manager)

"Nogle gange så er vi ikke forberedt på nogle ting der kommer ind fordi at det er noget der kører på gangene i Nice. Nice er ti gange større end Danmark, så der foregår selvfølgelig en hel del mere dernede, og der er også noget information der flyder som vi ikke nødvendigvis opdager, fordi at vi ikke er der, reelt har jeg flere gange overvejet om vi skulle have en, ikke en spion, men i hvert fald en udsendt medarbejder i NICE som kunne gå også samle lidt op dernede" (Manager)

Further, the organization within TI that sets the business roadmap for the wireless area is located in TI Nice, and therefore much information flows to TI Nice and around in TI Nice, and people in TI Nice is therefore closer to this information than people in TIDK, quote:

"... of course we have an eye on our competitors, where they are moving, what they are doing, what things there are coming, but is not so that, it is not extremely important for us here in Denmark, because it is not us who is sitting the agenda for our program, what our programs should contain, where our roadmap is leading. That comes from business which is located in Nice." (Manager)

"...vi har selvfølgelig øje på vores konkurrenter hvor de bevæger sig hen og hvad de laver, og hvad der kommer af ting, men det er ikke sådan, det er ikke så voldsomt vigtigt for os her i Danmark, fordi at det er ikke os der sætter dagsordenen for hvor vores program, hvad det er vores programmer skal indeholde, hvor vores roadmap går hen. Det kommer fra business af som sidder i Nice." (Manager)

Let us therefore take a close look at the moves by the players in the game surrounding the change, and the core of the game is, as discussed earlier, to have technical information and use technical information. One manager explained, quote:

"Manager: It is a fight about getting tasks, so if you disclose too much about why you want that task, well most people know why the other one want the task, and why you want the task yourself, people might have different motives to why one think one should have the task. But since it is a competition to get the task, then you should not disclose everything to the adversary. This is to put it roughly, I know that and in many instances we can talk us to a solution regarding the issues, but sometimes things go into chignon.

Kristian Hegner Reinau: Can you maybe give some examples of things turning out to your advantage or something not turning out to your advantage, and how it actually happened.

Manager: Yes, well, it is often the one in Nice we have had discussion with, it is not so much in the other areas, well, there we sort of receive what we shall have, because there is not really competition on the tasks, so it is actually only the RF group this is relevant for. When

we had these negotiations around Christmas time and New Year, there was some, the group down there are doing some design around some components. Originally that design was the design around the one concrete component which we make, which TI makes, and where we in Denmark had the area around that component and made the system around it. And it is that system they have eaten more and more into. So, well we have almost given up on that, that is just too bad, they have gotten that now. Right around that chip, but we have more chips, in reality more systems, because in the phone there we have GSM, which you can make telephone calls in, but you also have Bluetooth which is also a radio. Some you have wireless network in, which also is a radio, and FM radio and you have GPS receiver needs also, so of course all these different radios interfere with one another if you are not careful. So that is where I think our competence should be. And that is what we are trying to secure for us. And we will get it, but it is not final yet. It is, we sort of try to say that all surrounding the GSM radio which they do in Nice, and work on there, there we would like to push more and more work over to them, so that we can get more time for making those things, the system solutions. So that is our strategy now. But it is not a final deal so far, and it is something we have to talk with them about. We have to, we cannot just write a plan and say that is it."

"Manager: Det er den der kamp om at få opgaverne, så hvis man afslører for meget om hvorfor man gerne vil have den der opgave, det ligger de fleste ved godt hvorfor den anden godt vil have opgaven og hvorfor man gerne selv vil have opgaven, man har måske forskellige motiver til hvorfor man synes man skal have den opgave. Men i og med at det er en konkurrence om at få opgaverne, så skal man jo ikke afsløre alting. Overfor modstanderen. Det er at stille det lidt firkantet op, det ved jeg godt, men, og i mange tilfælde kan vi godt finde ud af at snakke os tilrette om tingene, men nogle gange så går det lidt i hårknode."

Kristian Hegner Reinau: Kan du give måske et eksempel på noget som gik igennem til jeres fordel eller noget som ikke gik igennem til jeres fordel, hvad der egentlig skete hvordan

Manager: Ja, altså det er meget den der i Nice vi har diskuteret med, de andre fagområder er der ikke så meget, altså der får vi egentlig det vi skal have fordi at der er ikke andre til at lave tilsvarende opgaver, der er ikke ligesom konkurrence på opgaverne, så det er egentlig kun den RF gruppe det er relevant for. Da vi havde de her forhandlinger omkring juletid og nytårstid der, der var der, der er nogle, den gruppe dernede sidder og laver noget design omkring nogle komponenter, og oprindeligt var det design inde omkring den ene konkrete komponent som vi laver, og som TI udvikler, og hvor vi her i Danmark havde det der lå rundt omkring den og lavede systemet omkring den. Og det er så det system der som de har ædt sig mere og mere ind på. Så det, altså det har vi næsten opgivet, det er bare ærgerligt, det har de taget nu. Lige omkring den ene chip, men vi har så flere, i virkeligheden flere systemer rundt omkring fordi i en telefon der har vi GSM ikke også, som du kan ringe telefon på, men du har også bluetooth som også er en radio. Nogle har du også trådløst netværk i, som også er en radio, og FM radio og du har GPS modtager behov og det, så alle de her forskellige radioer de forstyrrer selvfølgelig hinanden hvis ikke man passer på. Så det er der jeg mener vores kompetence skal ligge. Og det er det vi forsøger at trække til os. Og det får vi nok også, men det er ikke endeligt på plads endnu. Det er, men vi forsøger ligesom at sige at, alt det der ligger omkring GSM radio som de laver i Nice, og arbejder med, det vil vi gerne hvis vi skubber mere og mere arbejde over til dem på den, så kan vi selv få mere tid til at lave de ting, systemløsningerne omkring. Så det er vores strategi nu. Men det er ikke endeligt aftalt endnu, og det er noget vi skal snakke med dem om. Vi er nødt til det, vi kan ikke bare skrive en plan og så er det det." (Manager)

In the specific case of the RF work split with TI Nice, TI Nice apparently used information about missing technical information, so to say, to gain control over the RF work, as a manager explains:

"Where things start crackle, for my group, for RF, is when we have to do [NAME OF RADIO]. We are into a time, again, where we cannot get people, we cannot get permission to employ people, which means that we are to few people on the project. We can only put two RF peo-

ple on it, but finds out underway, that this technology is not at all mature, that we should have had far more people on the project. And that also means that suddenly Nice go in and makes a lot of system validation, which they did not do before, well, they go in and makes some measurements for us, which I have later gotten presented as something they always have done, but actually it starts with that project, that they test in full temperature across all the channels and voltages and so on, and there is no doubt that this is the time where RF System they feel, the management in Nice feel, that Denmark is not delivering the good with regard to information on the debug side of this chip. And that clearly we do not, because we have far too few people in the project. And that is maybe one of the places where things change so that suddenly, well, then Nice takes the power on that front, and don't think we have ever managed to really strike back at that. We have not. (Manager)

"Der hvor tingene begynder at krakelerer i hvert fald for min gruppe, for RF, det er da vi kommer ind og skal have Leonardo [Name of radio]. Vi er inde i en periode igen hvor vi ikke kan få folk, vi kan ikke få lov at ansætte folk, dvs. vi er for få folk til det projekt. Vi kan kun sætte to RF folk på men finder så ud af undervejs at den her teknologi den er jo slet ikke moden, vi skulle have haft mangt mange flere på. Og det betyder lige pludselig også at Nice pludselig går ind og laver en masse systemvalidering, som de ikke gjorde før, altså de går ind og laver nogle målinger for os, som jeg så senere også har fået fremlagt også som at det havde de altid gjort, men det starter rent faktisk med det projekt, at de tester i fuld temperatur over alle kanaler og spændinger osv., og der er ingen tvivl om at det er på det tidspunkt at RF system, de føler, ledelsen i Nice føler at Danmark ikke leverer varen med hensyn til information på debug siden af de her chip. Og det gør vi jo helt klart heller ikke, for vi har ikke folk nok på overhovedet. Og det er måske en af de steder hvor tingene ændrer sig til at pludselig så, jamen så tager Nice magten på den front, og det tror jeg aldrig vi har formået rigtigt at slå tilbage imod. Det har vi ikke." (Manager)

The manager above implies that TI Nice claimed what should have been the work area of TIDK, by conducting detailed tests of the radio TIDK worked, on at a time where TIDK was understaffed, and later used the errors made by TIDK to claim that TI Nice needed to do the work themselves. One can also ask whether TI Nice got the RF work through political games as he expresses, or whether it was a natural change given the technological development of the RF technology and the competences found in TIDK and TI Nice. A manager who joined TIDK in 2007, after a career as manager in different TI sites, amongst others TI Nice, had the latter view. He believed that the technological development has made the competences found in TI Nice necessary for the work, as he explains in the following quote:

"Manager: ...in the past... ... the GSM system was still so complex, Denmark was perfectly positioned to bring all this stuff together, meanwhile the integration level is much higher, lot of things are moved to DSP, please tell me if I use expression you don't understand

Kristian Hegner Reinau: Yes, DSP what

Manager: DSP is digital signaling processing; it means it's a special type of processor in a phone. It does mean that things you did in the past in hardware are now done by calculation on a specially designed processor. The other thing is that lot of external components of this small tiny stuff that is sold on the board, is now entered into one single piece of silicon. This has never been the expertise of Denmark, there are RF guys, yes it is true, but they are not SOC guys and they are not DSP guys.

Kristian Hegner Reinau: SOC what is that

Manager: System on a chip, this means you have to move the whole system, all the discrete components that are in between the antenna and your ear at the end, into one piece of silicon, you integrate the hardware on chip we call it. You move the system on chip, SOC. So move the system in there. And as you know, in Denmark there are no silicon designer, not one single, but the secret of the radio, how to design the radio, is moving into the silicon, or,

into the digital signal processing domain. That is a fact, you cannot change that. And Denmark is not set up for that. There is no expertise, there is no background, there is no skills available, on which you can build a foundation to catch up on that. In Nice, you have the layer one and the DSP team, so it is more or less natural that these guys absorb, and it would be in my opinion very stupid to stay competing in this domain, because they are miles away."

He went on to explain that because of this TIDK needs to move their focus to other radios than the GSM radio, for example Bluetooth and WLAN, as the other manager also stated was the strategy in fall of 2008 in the quote above. The question to ask is therefore: didn't people in TIDK see this change in technology?. Firstly it is a matter of personal feeling, quote:

"Of course we are talking here about people, about feelings, yes it is true, I mean there are old very skilled RF engineers, they did this for now maybe 6 years 7 years, and of course its worlds that breaks, but they did the change, they were successfully managing the change from a C net to a modern GSM phone development as well, I mean it was not the same, nobody is doing still C network anymore, I mean these old car phones that they used to have in the late 70's. It is also gone, I mean, engineering mean new stuff every day, and sticking with the old you will fall behind." (Manager)

Secondly, according to this manager, TIDK might be in the position where it finds itself today, because management in TIDK previously have too little focus on long term development, quote:

"Manager: ... I think [Name of person previously in the position this manager occupies in TIDK] did some efforts to pull in more of the right expertise, focusing on the hardware, I know that he was interested to have an SOC team in Denmark, but it was not successful, for several reasons. But I think the look ahead was not long term enough, so, and that is why we have now highly specialized people in Denmark, that we cannot use as this, for the old model, which means focusing on GSM only. And that's why I tried to think about new models, the expertise you need, that I'm deeply convinced. But not on GSM only.

Kristian Hegner Reinau: Ok, but does the radio, RF engineers, also get this picture today, or, this feeling has that changed during the recent years of we should do this in Aalborg

Manager: Not quick enough is my opinion, so that's the challenge for the management these days to convince that we cannot allow us self to stick to the old things. We need to see how we can widen our scope and don't get into a competition situation with internal Tiers, which is of no use for anybody, while the customer complains that several of our components don't play together and we only deliver bricks but not the platforms, and on the other hand we have internal competition who does place SAW filter next to radio, I mean that's simply stupid, so there is enough work, that is what I want to say, we have the right expertise to cover it, so let's talk about the work split."

Apparently, people in TIDK had, according to this manager, seen the change in RF technology come before, but not taken any actions upon realizing this, quote:

"Manager: ...Over time, I explained to you, that more and more software, complementary software, not modem software, complementary software, entered the mobile phone, it mean that you have additional hardware components around the chipset, like sensors, different types of sensors, peripheral radios, like GPS, something like that, and I feel that, that Denmark site did not take enough care on that one. They were a little bit ridged to their boundary, which was GSM, and then I think some trains overtook Denmark. It was not really, in the beginning it was not really, you couldn't feel it lets say, immediately, because still the big volume of mobile phones sold is in the low and mid segment, so you cannot feel it, but if I look at the growth rates, for the coming years, and even this year, you see that it's a clear gap. We missed the train. Meaning the look ahead of the management, the local management here for the next four years was not in place to the degree it should have been. They were not in-

volved in, consciously or not I don't know, it depends on the agenda of the old management, they had a good agenda, that is not what I say

Kristian Hegner Reinau: Were they blinded by the success of what they were doing in a way

Manager: Blinded is not the right word I think. They had success, but they were thinking that creating, covering the other aspects of the modem, which is DSP or SOC as I mentioned before, is sufficient to occupy this cake. And, while big gaps in TI was opening at the same time, simultaneously, on the application side, on the complimentary communications systems side, here the gaps were opening like that, and here the density of the people were higher and higher, so that you know, it, but, as you are always busy with a lot of customer asking similar things at the same time you don't feel that. You are just trying, oh god I have so many problems, let finish that and think afterwards. And, now, everything I brought up in Denmark I can say that people have thought through it already, so it is nothing really new,

Kristian Hegner Reinau: Then what is the difference

Manager: We are trying to push it now. We are doing it. We just not think, and then putting it in the shelf, drawer, again, but we try to really translate it into actions and implement it. "

So status in the end of 2008 was that TI Nice had taken over some of the work tasks within the RF domain of TI's GSM solutions, an area which previously belonged to TIDK. The forces that caused these changes were political games within TI between TIDK and TI Nice as well as the technological development within the RF field and the competences needed within this field.

What is interesting is that in interviews respondents within TIDK felt that they had been outmaneuvered in the political game within TI by people from TI Nice. One manager told, quote

"The French is heavily political, they, they seldom say things straight, they wrap it in, or, I have to be careful not to generalize, but those I talk quite a lot with, they wrap it in, and they try... They give us some half pictures. They never really reveal what they know, it is kind of the attitude that knowledge is power. So if you know something the other person don't know, then you can also control the other person in the direction you want. And we have [NAME OF MANAGER] who runs the RF group here, he has a counterpart in Nice, and there has always been some overlap between the two groups. And we have started some initiatives to make some cooperation between the groups so that we, at least, does not sit and do double work, which we have done earlier. Now initiatives have been started to make the situation better. But there is still a number of fights about the tasks, about who should do what, there is prestige in owning some certain tasks that are exciting, and then try to toss some of the slightly more boring tasks to the other. And that game is running all the time (Manager)

"Franskmændene de er voldsomt politiske, de, de siger sjældent tingene direkte, de pakker det ind eller, nu skal jeg også passe på ikke at generalisere, men dem jeg snakker en del med de pakker det ind, og de forsøger... De giver os nogle halve billeder. Man afslører aldrig alt hvad man ved, det er ligesom holdningen at viden er magt. Så hvis man ved noget den anden ikke ved, så kan man også styre den anden i en retning man gerne vil have ham i. Og vi har, [NAME OF MANAGER] som kører RF gruppen her, har en pendant i Nice også, der er også en RF gruppe i Nice, der har altid været en del overlap imellem de to grupper. Og vi har også taget nogle initiativer for at lave noget samarbejde imellem grupper så vi ihvert fald ikke sidder og laver dobbeltarbejde, det har vi gjort tidligere. Det er der så taget nogle initiativer til nu at få det forbedret. Men der er stadigvæk en del kamp om opgaverne, om hvem der skal lave hvad, der er prestige i at eje nogle bestemte opgaver som er spændende, og så forsøge at losse nogle af de lidt mere kedelige over til den anden. Og det spil der, det kører hele tiden." (Manager)

An engineer told in relation to the ability of TIDK employees to participate in the political games within TI, quote:

“Engineer: It is reality, well, and to get into that, then you have to go in and take those fights. It does never become other than verbal, well it is a game, and you have to learn to play along. And there we have a lot to learn in Denmark, we are not very good at this. ‘They are far better in France and Dallas. Well we always underplay the roles, and maybe we do not pinch the resources which need to get pinched. Well, we have, my view is after having been, I have also been in Dallas and Nice, there are significantly more, or at least when I was there earlier, significantly more, well the time pressure is nowhere near the same, because they have far more people to do things.

Kristian Hegner Reinau: Ok does that mean that there is more time for political thinking too

Engineer: Yes definitely. But we have to get in and think politically too, right, if for example we can see a task coming with two people. Then maybe we should not ask to get two people, then we will only get one, maybe we have to ask for four instead, right. And then maybe blow up something which technically is not necessary to blow up to get it, but there can be other good reasons for blowing it up. And it is a type of game where you can say, well, if you do not play it, then you lose, because you are also playing by not playing. Then it will be the other ones who are moving you around, so the alternative is to play and do something. And this is what we are trying to do right now I think, anyway that is what I feel we are doing. And there we are, the group I’m sitting in, we are very interested in doing it.”

“Engineer: Det er virkelig, altså, og for at kunne komme ind i den der så er man nødt til at gå ind og tage de der slagsmål. Det bliver jo aldrig andet end verbalt eller, det bliver et spil, man skal jo lære at spille med der. Og der har vi altså meget at lære i Danmark, der er vi ikke særligt gode. Der er de langt bedre i Frankrig og Dallas. Altså vi underspiller hele tiden rollerne, og får måske ikke gallet de ressourcer til, der skal gaffes. Altså, vi har, altså mit indtryk er efter at have været på, jeg har også både i Dallas og Nice, der, der er betydelejt mere, eller sådan var det i hvert fald da jeg var der tidligere, betydeligt mere, altså, tidspresset er slet ikke det samme, fordi de har langt flere folk til at lave tingene,

Kristian Hegner Reinau: Ok så vil det sige at der er mere tid til at tænke politisk også

Engineer: ja det er der helt sikkert. Men vi skal ind og tænke politisk også ikke, hvis vi f.eks. kan se der kommer en opgave med to mænd. Så kan det godt være at vi ikke skal bede om at få to mand, så får vi kun en, det kan være vi skal ind og bede om fire i stedet for ikke. Og så måske også blæse nogle ting op som måske teknisk set ikke er nødvendige at blæse op for at få det, men der kan være nogle andre gode grunde til at gøre det. Og det er den slags spil der som man kan sige, altså hvis du ikke spiller det, så taber du, for du spiller også ved ikke at spille det. Så bliver det de andre der triller rundt med dig, så alternativet er at spille gamet og gøre noget ved det. Og det er det vi prøver på at gøre lige nu synes jeg, det er i hvert fald det som jeg føler vi gør. Og det er vi da, den gruppe som jeg sidder i, vi er i hvert flad meget interesseret i at gøre det.”

I shall therefore in the next section focus on the work culture within TIDK with a special focus upon political games to investigate why some engineers and managers felt out maneuvered in the political games, and if the location of TIDK within the NorCOM cluster has had an influence in this respect.

Before turning to this, it should shortly be noted, that the struggle between TIDK and TI Nice mainly has influenced the hardware engineers. The software engineers working on protocol stacks entering TIDK with the acquisition of Condat and leaving TIDK with the restructuring of software development within TI in 2007 were involved in different political games within TI because they had different work tasks and therefore different points of contacts within TI, as a manager explains in the following quote:

".. the hardware part of this house, I have sort of touched upon this, was somehow in competition with San Diego. So there was not a really good relationship between San Diego and Denmark on the hardware site. But on the contrary, on the software site the relationship between the former Condat Denmark and the former Condat Germany was not really good, and they sort of made an alliance with the people in San Diego, because there were some layer 1 people over there which they to a large extent, especially in the later years, had a good relationship with. So depending on whether you look at the hardware part or the software part, then it is different alliances and grouping, power balances..." (Manager)

"...hardware delen her i huset, har jeg ligesom været inde og berøre, var på en eller anden måde i konkurrence med San Diego. Så der var ikke sådan det helt gode forhold imellem San Diego og Danmark på hardware siden. Til gengæld så på software siden var der ikke et særligt godt forhold imellem de tidligere Condat Danmark og det tidligere Condat Tyskland, hvorimod de så allierede sig lidt med demovre i San Diego, fordi der var nogle lag 1 folk derovre som de så i stor udstrækning, især i de senere år, havde et godt forhold til. Så afhængig af om man ser det på hardware delen eller på software delen, så er der sådan forskellige alliancer og grupperinger, og magtbalacer." (Manager)

Further according to another manager, the political games, to which the software engineers within TIDK have been exposed, have not had the same extent as the games to which the hardware engineers have been exposed. The reason for this is that the software engineers have been more centrally controlled from Dallas. This has been necessary to make the software solution, and it is due to a difference, which I shall elaborate on later, between software engineer and hardware engineers way of working, where the first are more concerned with process than the latter.

8 Different cultures

It was earlier described that TI is a relatively flat organization where it is important for people to put their own agendas on the scene, and pursue them in political games, if they are to change or control things. It is relatively far from the north-Jutland-engineering mentality found in TIDK to do so. I here write 'north-Jutland-engineering' mentality to underscore two issues in play. Firstly, TIDK consist of engineers who according to a manager often are relatively introverted in their personalities. Secondly, a large part of these are from North-Jutland, and have an North-Jutland mentality with what is called "The Jante Law", i.e. it is unpopular in peoples mind to promote one selves etc.. This mentality works, according to a manager, relatively poor within a multinational organization as TI, quote:

"But there is another issue in this regard, exactly in this regard, which we actually have work quite a bit with during the last years, and that is, well, my starting point have been, since I arrived, that we are in a global context, I came in 2003, we are in a global context and therefore we have to learn to work within this global context. One of the problems of doing this, that is a, what should one call it, personality which many of our engineers have. And especially engineers from North Jutland and Vest Jutland, they have a very humble attitude towards themselves and their work. And that does not cut it in a huge global company, where it is about, you should definitely not hide your light under a bushel. You have to get forward, over the plains, out and talk your cause, out and create relations, back and forth within the corporation, because that is how you get influence." (Manager)

"Men der er en anden ting i den her forbindelse, netop i denne her forbindelse, som vi rent faktisk har arbejdet en del med over de senere år, det er jo altså, mit udgangspunkt har været, siden jeg kom, at vi er i en global sammenhæng, jeg kom jo i 2003, vi er i en global sammenhæng, og så skal vi lære at arbejde indenfor denne her globale sammenhæng. Et af problemerne, med at gøre det, det er den, hvad skal man sige, personlighed som mange af vores

ingeniører har. Og specielt nordjyske, vestjyske, ingeniører, de har en meget ydmyg holdning til sig selv og til sit arbejde. Og det holder ikke i en stor global virksomhed, hvor det drejer sig om det er, at man skal sku ikke sætte sit lys under en skæppe. Du skal frem, ud over stepperne, ud og tale din sag, ud og skabe relationer, på kryds og tværs i koncernen, for det er derigennem du får indflydelse" (Manager)

An engineer also explained that he saw a difference between engineers from North Jutland and engineers from other places in Denmark:

"I think it is very implied [HOW YOU ACT IN RELATION TO KNOWLEDGE DIFFUSION]. And I also think that because people are underdogs to a degree here in Aalborg, compared to Copenhagen definitely, and Aarhus maybe also, then I think there is more network thinking here, right. We have to show them. I think that I think, now I'm coming from the outside in this regard, the whole university structure at your university is also a bit different from what I have been used to from home. So I think that have been very implied. But it is not something that have been strange to me, again, because it is also in the mentality, but I think it is stronger up here. Well I do not think, it is not a coincidence that these companies that start up here, that they have started here, it is because there have been a strong network thinking. So I think" (Engineer)

"Jeg tror det er meget underforstået [HVORDAN MAN AGERER I FH. VIDENSSPREDNING]. Og jeg tror også fordi man er lidt underdog her i Aalborg, så tror jeg, i forhold til København i hvert fald, og Århus måske også, så tror jeg sådan der liggeren lidt mere netværkstankegang i tingene her, ikke. Vi skal vise dem. Og det tror jeg, nu kommer jeg udefra, på hvad det angår, hele undervisningsstrukturen på jeres universitet er jo også lidt en anden end det jeg i hvert fald har været vant til der hjemme. Så jeg tror den har været meget underforstået. Men det er ikke noget der har været fremmed for mig, igen, fordi de ligger også meget i mentaliteten, men jeg tror den er stærkere heroppe. Altså jeg tror ikke det, det er ikke et tilfælde at de virksomheder der starter up her, de er startet her, det er jo fordi at der har været en stærk netværkstanke. Det tror jeg." (Engineer)

Interestingly he sees the mentality in north Jutland as something that promotes networking between engineers. We should see the North Jutland mentality as a mentality that makes people focus on helping each other to reach good technical results, and then they let the technical results speak for themselves. In other words, people with this mentality help each other to reach a good technical solution, but the mentality works against them in standing up within an organization as TI and promoting themselves and their skills using the technical solution as a tool to do this.

This North-Jutland mentality and the introvertedness of some engineers therefore work against engineers in TIDK making themselves visible within TI. One manager explained:

"Manager: We have, well, in many situations, and we still do, tried to tell the engineers, take the phone, call your colleagues, who are sitting in some where far away, or where they are, talk to him, and so. The problem is very often the mentality of these engineers, right. Because they find it very difficult to break past this threshold, they have difficulties calling. So they rather write an email, which is maybe misunderstood, or they do not get an answer, and therefore do not do anything, instead of taking the phone or traveling down, traveling to meet the person and get the issues discussed and so. That is some of the issues we have been struggling with, and it is such things that are important when you change from being a small organization, a small independent firm, to getting in and having to act in a large company, right. Yes it is, and it is very difficult because you are all the way in, touching upon the personality of people.

Kristian Hegner Reinau: Do you have any, you said earlier that it was especially engineers from North Jutland and the middle of Jutland that was

Manager: Well, that is because there is this, at the same time, well of course you will find just as many introvert, what is it called, engineers in Copenhagen and other places too, but it is a bit reinforcing here that you have this modest, humble approach to things, right. Which I still believe is a very Jutlandic part, at any rate a part of our upbringing, right, you should not think that you are anything, and now go and take care of your work, right, and make sure it is done well, right, and all these things people especially in Jutland are raised with, right. That is not promoting for acting in a big organization. And that is why some people, now I am not saying that all people here are like that, because then we would not be where we are today. But there is a part of the people who have that as a skeleton in ones cupboard, in relation to working here. That is how it is."

Manager: Vi, altså, vi har i mange situationer, og vi gør det løbende også, forsøgt at sige til de enkelte ingeniører jamen grib knoglen, ring til dine kollegaer, som sidder i langt bortstand eller hvor folk nu sidder, snak med ham om det her, og sådan noget. Problemet er meget ofte de her ingeniørers personlighed ikke også. Som gør at de har svært ved at bryde den her tærskel, de har svært ved at tage knoglen. Så hellere skrive en e-mail, og blive misforstået måske, eller ikke få et svar på det, og så dermed ikke gøre nogle ting. Sådan istedet for at tage telefonen eller tage ned, tage en tur ned og besøge vedkommende og få talt de her ting igennem og sådan noget. Det er sådan nogle ting vi har slået med, og det er sådan nogle ting der er væsentlige når man går fra at være en lille organisation, lille selvstændig virksomhed, og så ind til og skal agere i en stor virksomhed, ikke også. Ja det er det, og det er sku svært fordi du er jo helt inde og røre ved folks personlighed her.

Kristian Hegner Reinau: Har du nogen, for du sagde før at det var især de nordjyske og midtjyske ingeniører der var sådan lidt

Manager: Jamen, det er fordi der samtidig er den her, altså du finder selvfølgelig ligeså mange introverte, hvad hedder det, ingeniører også i København og andre steder, men det er så lidt forstærkende her at man har den her beskedne, ydmyge tilgang til tingene ikke også. Som jeg stadigvæk tror på det er en meget jysk del i hvert fald, del af vores opdragelse, ikke også, du skal ikke tro du er noget, og pas du nu dit arbejde ikke, og sørg du nu for at det bliver gjort ordentlig nok, og alle de der ting som folk specielt i Jylland er opdraget med, ikke også. Det er ikke fremmede for at agere i en stor organisation. Og derfor er der, der er nogle folk, nu sidder jeg ikke og påstår det er alle folk her, for så havde vi ikke været hvor vi er i dag. Men det er der en del der ligesom sidder med de lig i lasten, i relation til at arbejde her. Sådan er det"

This mentality also surface when presented with political games within TI. One manager explained that in a multinational corporation like TI it is necessary for people to promote themselves and their ideas within the organization. However, it is relatively far from the North-Jutland mentality to do so, quote:

"And it is far away from, in the initial position it is far away from our culture here to do that [STAND UP AND SAY YOUR OPINION WITHIN THE ORGANISATION]. Because we will rather sit down, our engineers are very proud professionally, and they sit down, and they do a good piece of work, and if that person in USA or in France cannot see that this is a good piece of work, then it is he who has a problem and not me. Instead of coming out with the issues, well, saying, listen to this my friend, I have made something here, and I believe in this, and this is how it is going to be, right. That you don't do. And it is a culture we have been struggling with, trying to change, but it has been very difficult, because it is so fundamental with many engineers. So the people who have made themselves count within TI, that is the most extroverted people, the most extrovert people. It is the ones who dare to stand up and say something in different contexts and that is maybe not the best engineers, but that is the way it is." (Manager)

"Og det ligger langt væk, i udgangssituationen så ligger det langt væk fra vores kultur, her, at gøre det [AT rejse sig op og sige sin mening i organisationen]. Fordi vi vil hellere sætte os

ned, vores ingeniører er meget fagligt stolte og de sætter sig ned, og de laver et godt stykke arbejde, og hvis den person derovre i USA eller i Frankrig ikke kan se, at det her er et godt stykke arbejde, så er det ham der har et problem og ikke mig. I stedet for at komme ud med hvad det er, altså, og sige hør her kammerat, jeg har lavet en noget her, og jeg tror på det her og det er sådan her det skal være, ikke også. Det gør man ikke. Og det er den kultur som vi jo ligesom har kæmpet med, at få skabt nogen ændring på, men det har været meget svært, og, fordi det er så fundamentalt hos mange ingeniører. Så de folk der har gjort sig gældende hos os, ved TI, det er de mest ekstroverte folk, de mest udadvendte folk. Det er dem som tør at rejse sig op og sige noget i forskellige sammenhænge, det er måske ikke de dygtigste ingeniører, men sådan er det jo." (Manager)

The manager explained that this mentality is the largest obstacle preventing people in TIDK from promoting themselves within TI and gaining influence. According to him, the thing preventing engineers in TIDK from gaining influence within TI was not a lack of formally influence within the TI, knowledge sharing systems within TI or the organizational structure within TI; it was rather this mentality of the engineers, quote:

"It is my firm belief that, and I have been here for 6 years now, and looked at it, and tried to change it, it is because we have this behavior here, which is so very difficult to change, we cannot get the people of the launch pad. Well, make them take that step and go out and emphasize themselves and do something out there. That is, it is my firm belief, that this is the largest obstacle for gaining influence"

Efter min bedste overbevisning, og nu har jeg været her i 6 år, og set på det, og prøvet på at være med til at ændre det, så er det fordi at vi har en adfærd herhjemme, der simpelthen er så svær at gøre noget ved, at vi kan sku ikke få folk ud over rampen, altså til at tage det der skridt og gå ud og markere sig og ville noget derude, det er, efter min bedste overbevisning, det er den største hindring for at vi ikke får den indflydelse." (Manager)

Again, this makes sense, because people having the North Jutland engineering mentality like to help each other to reach good technical solutions, and then letting the solutions speak for themselves. When presented with the political game within TI where people question the quality of the technical solutions produced in TIDK, the engineers apparently believe that the people are idiots because they cannot appreciate the technical level in the solution and therefore don't take parts in discussion.

What they are maybe missing out on, is that it is not necessarily because of the technical issues they are criticized, to take this as an example. It can also be as part of a political game. And the existences of political games within an organization as TI, are apparently relatively far from the understanding of engineers with the North Jutland engineering mentality. They seem to believe that it is natural for engineers within a company to help each other by sharing information without view upon the potential use of such information in political games. An engineer explained the problems the employees with TIDK faced when they became part of TI, and one issue he focused on was the fact that French people within TI does not share knowledge as people in TIDK, i.e. they do not have this the north-Jutland mentality, of sharing knowledge, quote:

"Engineer: Well it has taken, it has taken a long time to get in and understand it, and these cultural problems are actually still cause troubles. There are still fights that you cannot sneak past, where you have to enter conflicts regarding some issues, and with other things you have to say that this is due to cultural differences, and that we cannot handle the way we are used to.

Kristian Hegner Reinau: can you give some examples on such cultural differences

Engineer: Well, you take something like sending an email to a Frenchman you don't know. Then you risk that he does not answer you back. You have to, we have, in Denmark we have

this high level of confidence, we trust each other. 70%, the highest in the world and it goes all the way down to Slesvig Holsten. That is not something that disappears easily. It is very deep in us, and this means, that if I ask someone here about something, well, then it is implied that I have good intentions, that I want something. But it is not if I ask a Frenchman, or an American, for that matter. Then it is not implied, that I have a good intention. That is something you have to earn somehow. So this means that I cannot just ask whether I can get access to something. Can I get access to that because I am just working in this, it is not enough just explaining it. There have to be some actual title on it, to explain to him that he is allowed to give it to me, a backup by management. That is a very concrete difference you have to work with."

"Engineer: Jamen det har jo taget, det har jo taget lang tid at komme ind og forstå det, og det volder sådan set stadigvæk kulturproblemer. Der er stadigvæk kampe og som man ikke, som man ikke kan snige sig udenom hvor man er nødt til at tage nogle konflikter på nogle ting, og andre ting er man nødt til at sige, det er kulturforskelle, og det kan vi ikke klare på den her måde vi plejer at klare tingene på.

Kristian Hegner Reinau: Kan du give nogle eksempler på sådan nogle kulturforskelle.

Engineer: Jamen altså bare sådan noget som at sende en mail til en franskmand man ikke kender. Så kan du risikere han ikke svarer dig. Du skal have, vi tager, i Danmark tager vi, altså vi har jo den her høje fortrolighedsniveau, vi stoler på hinanden. 70% det højeste i verden altså, man kan også se det det går ned til Slesvig Holsten de er også med der, det er altså ikke noget der forsvinder så nemt. Det ligger meget dybt i os, og det vil så sige, at hvis jeg spørger en her om noget, jamen så er det underforstået at jeg har en god hensigt med det. At jeg vil noget. Men det er det altså ikke spørger en franskmand eller en amerikaner, for den sags skyld. Så er det ikke underforsået at jeg har en reel god hensigt. Det skal du ligesom gøre dig fortjent til. Så det betyder at jeg kan ikke bare sige kan jeg lige få adgang til det. Kan jeg lige få adgang til det for jeg er lige i gang med det og det, det er ikke nok bare at forklare det. Der skal en eller anden faktuel titel på der forklare at han er det og han må det, der er backup af management. Det er sådan en meget konkret forskel som man skal arbejde med"

This is possible one reason why TIDK engineers and managers felt outmaneuvered by engineers and manager in TI Nice as discussed in section 7.3. That the French engineers are think more politically regarding diffusion of information than engineers with the North Jutland engineering mentality. We might ask then, if these engineers are good at spreading knowledge, why does an engineer coming from the outside then state in an interview that he believe they are worse at spreading knowledge than French engineers. One reason could be that the Danish engineers find the French behavior strange, and therefore talks more to each other, that they talk to people in other TI sites who do not have this North-Jutland mentality. We could then ask, why does TIDK engineers with the North-Jutland mentality not participate in political games within TI. The interview points to the explanation, that this is because another side of the North-Jutland mentality is to avoid confrontation. This explanation is backed by the following quote from an interview with a French engineer working in TIDK. He had not worked for TI in France, but for different French firms, and his observation regarding TIDK was, quote:

Engineer: What I understood from the Scandinavian social organization, is that it's much more "conflict avoidance oriented" than the French one. In Southern Europe culture ending to the ultimate point of conflict has no significance with traumatism. People shouting and fighting is not a problem, it is in Scandinavian regions when it escalades to a non return point of communication. Nevertheless, I have experienced also same considerations working in Spain. There are a lot to do also with engineering culture. How to say to engineer(s): it is wrong you have to do it another way?

Kristian Hegner Reinau: What happens if you do.

Engineer: If you do so, you lose communication with the people. You lose your time, because in fact, it is not efficient, because the people will not speak together then, we will lose communication, I got this experience in Sweden. So I know what happens. When you go too far with a conflict, the people stop speaking to you..

Kristian Hegner Reinau: So you are just ignored

Engineer: Yes. But then if you look in cultures like mine, if we put a conflict on the table, we can fight, shout, and two days after we go to the restaurant, we have a good meal, and we have fun. In Denmark and generally in Scandinavia I have noticed that conflicts are avoided, and prevented. I mean, this is why you have all these kinds of preparations. For example I just bought a house in Denmark. You have a lot of meetings to prepare potential conflicts and override a potential failure. So you put the conflict away. A lot of multi-lateral documentations are written and agreed with the participation of lawyers, carpenters, various housing experts including insurances to avoid potential source of conflicts. If a conflict rises later insurances will take over. In France, we have also these phases of preparation but in a different manner with higher risk for conflict. This is just an example, I have participated to Technology Transfer negotiations in Sweden where the level of "agressivity" was equivalent of what I noticed in France. It is difficult and dangerous to go for stereotypes but there are some basic rules to respect in Scandinavian countries to sustain constructive relationships.

Kristian Hegner Reinau: But I was wondering, there must be conflicts, do they then just take place in the corridors or in the hidden more than in France where you talk about them and have conflicts at the meetings.

Engineer: The form and place are not so important. A conflict can be raised and solved in any kind of places. So it is in every culture. The fact is that there is no taboo, in France, to perform a negotiation in "hidden place" and so to orientate a meeting toward the agreement taken prior..Obviously it will create conflicts with other stakeholders, but this the art of negotiation as teaches in a lot of business schools. I'm not so experienced in Denmark, in Scandinavian culture, to say, ok I can do that in the corridor, I cannot do that, but, what I know is that I want to avoid conflict in this kind of culture it is not efficient compare to discussion with proper argumentation, to prepare the path, to organize meetings before, to get some mentor helping, which can sustain the argumentation, rather than putting on the table bad topics, and creating the noise. Conflict a lot to do with stress. Environmental aspects are important to take into consideration in managing this parameter."

So apparently, to exaggerate a bit to make the point clear, the situation for engineers in TIDK is the following: Engineers with the North-Jutland mentality in TIDK likes to help each other, and share information openly, and then let the produced technical solution speak for themselves. What happens in TI is that the solutions are questioned by people from other sites, as part of the political games within TI, but because of a lacking focus on political games, engineers with the North-Jutland find this strange or annoying, and believe that the people who question their solutions are idiots, and that their view on the technical solutions are wrong. But to avoid confrontations, they don't enter into discussions, i.e. into the political games. The result of this is that they lose in the political games, because as an engineer who played the game said, not playing the game is also to play the game, you just lose.

Of course engineers with the North-Jutland mentality can learn to play political games too, and interviews of both managers and engineers showed that this is what has happened during the time of TIDK, as discussed in section 7.1. As stated, some engineers who became managers saw the political game as something annoying. It is here important to note, that it according to a manager with non-engineering background is possible to compare TIDK to for example an old-fashion shipyard:

"I have actually compared it to shipyards and such earlier, where, if you had a good worker, then he became a gaffer, and if he was good as gaffer then he became master, and if he was good as master then he became production manager and so forth. Well, now I have to be careful, because it is not all engineers that have this constrained view. There are many with an engineering education who also have a boarder view on this, and you can say in this case, that where they have to make themselves count is also against other engineers around the world, so I actually think. Well, I don't think that you at that manager level will be able to replace them with non-engineers, because it is necessary, that you understand the issues. But you have to be aware that the ones who are going to be managers have to be the more extrovert people, who are not afraid about promoting themselves. Well, to some extent, of course you don't want to go to the extreme opposite either. But you have to have an ability to promote yourself. (Manager)

"Jeg har faktisk tidligere sammenlignet det lidt med værfter og sådan noget, hvor man jo tidligere har, hvis man havde en god arbejder, så blev han sjakbajs, og hvis han var godt som sjakbajs, så blev han mester, og hvis han var god som mester, så blev han produktionschef, og så fremdeles ikke. Altså, det, nu skal jeg jo også passe på, fordi det er jo altså ikke alle ingeniører, der har det indskrænkede syn. Der er da mange med en ingeniørmæssig uddannelse, som også har et bredere syn på det her, og man kan sige, der hvor de skal gøre sig gældende, det er også overfor ingeniører andre steder i verden i det her tilfælde, så jeg tror egentlig. Altså jeg tror ikke at du vil, på de der managerniveauer, vil kunne erstatte dem med ikke ingeniører, fordi det kræver også, det kræver også at man er inde i sagerne. Men man skal være bevidst om at dem der skal være managere, det er nogle udadvendte folk, som ikke er bange for at promovere sig selv heller. Altså, i en hvis udstrækning, selvfølgelig skal det heller ikke være helt ovre i den anden grøft. Men man skal have en evne til at kunne promovere sig" (Manager)

For the engineers and managers who were aware of the games and different cultures between the sites, it was not difficult to obtain information, as an engineer explained:

"I will say, that contact both to the USA and India and France, I feel that this is incredibly straightforward and open. I don't feel that somebody is holding back information or don't want to help us. A actually feel that there is an good openness in the corporation, and I feel that you easily can get access to get involved in tasks, even though you maybe not are one of the persons assigned to the task. The problem can then be, if you don't have time to commit yourself decently, then of course you cannot get decently into the task" (Engineer)

"Jeg vil sige, at både kontakt til USA og Indien og Frankrig fornemmer jeg i hvertflad er utrolig ligefrem og åben. Jeg fornemmer ikke nogen, at der er nogen der holder informationer tilbage eller nogle der ikke vil hjælpe osv. Der fornemmer jeg egentlig god åbenhed i koncernen, og jeg fornemmer også at man sagtens kan få lov at blande sig i ting selv om man måske ikke lige er en af dem der er sat på opgaven. Problemet kan så været, at hvis du ikke har tid til at blande dig ordentligt, jamen så kan du selvfølgelig ikke komme ordentligt ind i det." (Engineer)

Returning to the issue of the special mentality or culture found within TIDK. This also shows in relation to how engineers interpret rules regarding confidential information within TI:

"There are of course some rules about what you cannot do. Well, for example, we are not allowed to mention the names of our customers. Well, we are not allowed to, I am not allowed to, now I can tell you because you have signed this, but if you had not done that, then I was not allowed to tell you, that I sit and work with [NAME OF HANDSET PRODUCER], you see. That I cannot say. But well, what one can say is that I sit and work with [SHORT DESCRIPTION WHICH MAKES IT CLEAR WHAT HANDSETPRUDCER HE MEANS, WITHOUT MENTIONING THE NAME OF THE COMPANY], yes well, then I have not said to much, you see. So in that way there are some rules for that, but in reality they do not apply in Denmark, they

apply in USA, because again, here we have this trust culture. So I think anyway. And that is why people know, people know what the different companies here are doing. The competitors you know, Infineon and Analog Devices, when they existed, well, they know what we are doing here. We also know, we have an idea about what they are doing out there. And then you can go and put rules on it, but, how many roles do we really, well, normally we are not so happy about rules in Denmark. Yes unwritten rules, those we are very happy about. So no, except from the rules about not mentioning customer names, that I try not to do as far as possible when I talk to others about it. Well, if it is outside, if it is someone outside here". (Engineer)

"Der er selvfølgelig nogle regler om at man ikke må, altså f.eks. må vi jo ikke nævne kundenavne. Altså, vi må ikke sige, jeg må ikke sige, nu må jeg jo så sige det til dig fordi du har skrevet under på det der, ellers må jeg jo ikke sige at jeg sidder med og arbejder med [NAME OF HANDSET PRODUCER] vel, det må jeg ikke sige. Men altså, så kan man jo sige jeg arbejder [SHORT DESCRIPTION WHICH MAKES IT CLEAR WHAT HANDSETPRUDCER HE MEANS, WITHOUT MENTIONING THE NAME OF THE COMPANY], ja altså, så kan, så har jeg jo ikke sagt for meget vel. Så på den måde er der nogle regler for det, men det er sådan, de gælder reelt set ikke i Danmark, de gælder i USA, fordi igen her, vi har den tillidskultur. Det synes jeg i hvert fald. Og det, så derfor, folk ved jo godt, fordi, folk ved jo godt hvad de forskellige virksomheder laver her. Altså konkurrenterne, Infineon og ADI, dengang de fandtes, jamen de ved jo godt hvad de sidder og laver her. Vi ved også, vi har også en ide om hvad de sidder og laver derude. Og, så man kan jo godt ligge regler ind over for det, men, hvor mange regler er det lige, altså vi er jo ikke så, normalt, så glade for regler i Danmark. Jo uskrevne regler er vi rigtigt glade for. Så nej, altså ud over den regel med at vi ikke nævner kundenavne, så det prøver jeg så vidt muligt ikke at gøre når jeg snakker med andre om det. Altså, hvis det er udenfor, hvis det er nogen udenfor her." (Engineer)

An engineer explained that he had not read the staff handbook and the rules in it, and that he had no intentions to do so, quote:

"Well, we have a handbook, staff handbook, with rules in it. I have never read it. And I have no interest in reading it, because basically I believe, that it should not be necessary to read a staff handbook to go to work. Well, I really don't believe that should be the intention" (Engineer)

"Altså vi har en håndbog, personale håndbog, der står regler i, jeg har aldrig læst den. Og jeg har heller ikke interesse i at læse den fordi, fordi jeg mener dybest set, så bør det ikke være nødvendigt at læse en personalehåndbog for at gå på arbejde. Altså det mener jeg virkelig ikke kan være meningen." (Engineer)

He had taken courses in export control, because he had to do so, but he also explained that he did not like the punishment culture that TI had in this regard, quote:

"Engineer: ... it is something they force in courses, well, that we are forced to do, so that we do. I have done it to. But on that level, then we does it, of course, yes.

Kristian Hegner Reinau: But when you say that it is something you have to do, is it then also something that means anything in practice, or is it just, not I got something I can tick the box, so,

Engineer: Well, again, of course it have a consequence in practice, I have a huge consequence, especially when we get outside this country. But well, they have a, well, this is an American company, so you have an Anglo-Saxon culture of threats. If you don't do this then you get slapped, then that will happen. It is a bit in that way, and that way, it bounces a bit on Danes."

"Engineer: ... det er jo noget som de tvinger i kurser, altså det er vi tvungne til, så det gør vi så. Det har jeg så også gjort. Men altså på det niveau, så gør vi det selvfølgelig ja.

Kristian Hegner Reinau: Man hvad så, nu du siger at det er noget man skal gøre, men er det så også noget der har noget betydning i praksis, eller er det bare sådan, at nu har jeg et kryds af, så kan jeg,

Engineer: Jamen altså det er igen, selvfølgelig har det en betydning i praksis, det har en stor betydning, især når vi kommer udenfor dette her land. Men altså, de har sådan en, altså, det er et amerikansk firma, så man har sådan en angelsaksisk trusselskultur. Hvis du ikke gør det, så får du smæk, så sker det. Det er sådan lidt den måde, og den måde, den preller lidt af på danskere."

He then elaborated upon this:

"Well, for example when they say that this and that person got into jail for so and so long time, because they did this and that, and yes, so what, you would definitely not do that in Denmark, that is for sure. That we are convinced off. Maybe I am wrong, but well, for me it seems a bit like using a pillory. You put it out, that the way you do it for example in the export control things. And then they have one, where one have brought something to Russia and is stopped in toll. And again they put out these dangerous examples, and they have gotten fines and so and so and so. And, well, I try, I would actually like to not focus on it, and then try to act ethical. Always try to have an attitude, instead of putting a lot of rules on people. And then when someone comes and threatens us with, for example that we may not bring our boards out to some customers, which is a completely ridiculous arrangement, that you cannot bring it, well, that's the way they have made the export control. Well then we have to not bring it along, there is nothing more to it. But I don't really know, well again this is a completely clear cultural gap in relation to the understanding, how export control is. I can understand what they say, and that we may not sell it to blighters and Taliban's and that sort of people, and that you may not give it to another man with the intention that he gives it to a third, if he knows, and such stuff. But then the threat comes up, and it actually causes it all to fall to the ground. Well, it is not really motivating. Well, it was maybe more motivating to say that, well, if we can keep this technology from these people, then, and then putting it in a positive way instead." (Engineer)

"Jamen altså, altså når man f.eks. man siger, at den og den person kom i fængsel så og så længe, for at gøre det og det, og ja, so what, det vil du i hvert fald ikke gøre her i Danmark, det er helt sikkert. Det er vi overbeviste om. Det kan godt være jeg tager fejl, men altså, det, for mig virker det bare sådan lidt gabestokagtig. Man hænger det ud, det gør man f.eks. sådan i eksportkontrol tingene der. Og så har man en, hvor der er en der har taget noget med til Rusland, og blevet stoppet i tolden. Og altså igen hænger de her farlige eksempler ud, og de har fået bøder for det og det og det og sådan. Og, men altså, jeg prøver at, jeg vil egentlig helst se bort fra det, og så vil jeg prøve at handle etisk. Altså prøve hele tiden at have sådan en, altså en holdning frem for at sætte en masse regler ned over folk. Og når der så kommer nogen og truer en, altså f.eks. med at vi ikke må tage vores boards med ud til nogle kunder, hvilket er en totalt latterlig foranstaltning, at man ikke må tage det med, men altså, det er sådan man har lavet det med det eksport kontrol. Jamen så må vi lade være med at tage det med, så er den jo ikke længere end det. Men altså jeg ved ikke rigtigt hvad, altså der er igen, der er helt klart en kulturkløft der også i forhold til den forståelse der, af hvordan eksportkontrol er. Jeg kan godt forstå hvad det er de siger, at vi ikke må sælge det til bavianer og talibanere og den slags, og man må heller ikke give det til en anden mand med henblik på at han giver det til en tredje man, hvis han ved det, og sådan noget der. Men så er det så det der trussel der kommer op, og det virker, så flader det hele egentlig lidt til jorden. Altså det er egentlig ikke særligt motiverende. Altså det var måske mere motiverende og sige at, altså hvis vi kan holde

den her teknologi fra de her mennesker, så, altså sætte det op positivt i stedet for.” (Engineer,)

The bonus system and performance measure system TI employs to measure the performance of engineers also builds on an American culture. One engineer explained that he liked the idea of keeping people working by using incentives, but that the method also contained some American culture:

”Engineer... I sort of like the idea about keeping people going, but I can have my doubts about those methods used. It is a bit this ANGELSAKSISKE punishment moral.

Kristian Hegner Reinau: I am sitting and thinking, what are the incentives for jumping up [IN PERFORMANCE LEVEL]

Engineer: Well they are, then incentive is that you get the possibility of obtaining more goods. For example if you jump up [IN PERFORMANCE LEVEL] then you can get some different bonuses. Then you can be lucky suddenly to get a check of 30 or 40.000 or something, if you deliver a good work.

Kristian Hegner Reinau: Those DPM talks, do that have any influence on the work in practice, I mean, are they taken seriously and do you work according to them, or is it more something you have to

Engineer: They are instructive. It is not. It is, well I have tried both things. I had a manager earlier where I was pinned on something he had put in it which I could not vouch for, so I was pinned on it. So it was used to hit me in the head with. Even though, two or three years later it actually turned out that I could use what I had made. Which also gave me the feedback that I needed, that what I had done was right. Bit well, it is up to the managers, in reality a lot the top managers, to decide how to use that. But it is quite pragmatic because my managers know that the world is changing fast. Maybe the project we did yesterday is completely different tomorrow, and then it is no use that we put in a year plan that this is the goal. Then I can stand at the end of the year and say, oh yes, the project closed after three months so I have done nothing the rest of the year. That’s not how it works, but well, it is building on a predictability which is not present.”

!Engineer: ... intentionen om at holde folk kørende kan jeg sådan set godt lide, men jeg er måske lidt mere i tvivl om de metoder der, det er også sådan lidt den der angelsaksiske straf moral der hvor man

Kristian Hegner Reinau: Jeg sidder og tænker på hvad er incitamenterne for at hoppe op der [IN PERFORMANCE LEVEL]

Engineer: jamen den er, incitamentet er, altså du får mulighed for nogle flere goder, f.eks. hvis du hopper [UP IN PERFORMANCE LEVEL] så har du mulighed for at få nogle forskellige bonustyper. Så kan du måske være heldig at få en check på en 30 40000 eller sådan lige pludselig, hvis du har leveret et godt stykke arbejde.

Kristian Hegner Reinau: De der DPM samtaler, har de nogen betydning i praksis for arbejdet, altså de bliver taget alvorlig og arbejdet imod, eller er det mere nu skal vi også

Engineer: Det er vejledende. Det er ikke. Det der er, altså jeg har været ude for begge dele. Jeg havde en tidligere chef hvor jeg blev hængt op på noget som han havde skrevet ind som jeg ikke kunne stå inde for, så blev jeg hængt op på det. Så blev det brugt til at dunke mig i hovedet. Selv om, men to tre år senere, så viste det sig at det faktisk godt kunne bruges det jeg havde lavet. Hvilket også gav mig det feedback som jeg havde brug for, nemlig at det her, det var den rigtige måde jeg gjorde det på. Men altså det er sådan meget det der med at man,

nogen chefer, det er i virkeligheden meget op til topcheferne der bestemmer hvordan man bruger det der. Men altså, som det er nu er det meget pragmatisk fordi, mine chefer ved jo også godt at verden ændrer sig meget hurtigt. Altså det projekt som vi lavede i går, det er måske et helt andet i morgen, og så kan det jo ikke nytte noget at vi skriver ind i en årsplan at det er det her der er målet. Så kan jeg stå ved enden af året og sige det der det lukkede for øvrigt efter 3 måneder og så har jeg bare kunne gå og loppe resten af året. Sådan kører det jo ikke, men altså det er sat op på at man har en forudsigelighed som måske ikke altid er til stede.”

It should here be mentioned, that according to the management in TIDK, the idea behind the DPM tool is that the goals specified in the DPM talks are updated continuously, so that if the situation in the company changes, then the goals should change accordingly. Therefore DPM as a tool should be able to function in a dynamic company like TIDK. However, a manager also said in an interview, that sometimes goals were not updated in practice.

An engineer explained about the culture, and how the culture found in TI could open doors to information in other Scandinavian firms, quote:

”Engineer: .. it is a cultural difference, so therefore, it is a real problem no matter how we twist and turn it. Well, what you can do is that you can go down and lobby and talk to them and make it clear to them. Well, when we sometimes are in Nice, then we can talk to those people, who are maybe working on these things, but it is hanging a lot on the fact that we cannot assume that we have accept to go in and obtain that knowledge. And that is, what shall I say, that is a strong issue in knowledge sharing, and that is also why we stand strongly in Denmark I think. One of the parameters anyway.

Kristian Hegner Reinau: You mean that you are better at sharing than they are in say France.

Enginner: Well, there is nothing, you have real intentions, well, this guy would not come and ask me unless he wanted this, if not then he would not ask me. Well, that is sort of the song playing in my head. One is coming and asking me if I can help, well then I will show there and there, do this and that, whereas the Frenchman will ask, does he have the permission to do this.

Kristian Hegner Reinau: How, now you mentioned the cultural differences but also the politics with conflicts, can you give examples on that or

Engineer: Well conflicts, it can be such a thing as tasks, attractive tasks, where you have to get in and fight a little for them. Or make sure, that demands then that you find the right managers for alliances, and that also takes some correct arguments. Sometimes it is also about, like in football, simply to stand in the way, so that they can’t get past you. Well, due to the fact that we live close to [NAME OF NORDIC HANDSET PRODUCER] and we have the same, well, the same way to communicate, then we stand strongly in respect to cooperation with [NAME OF NORDIC HANDSET PRODUCER], so in that way we can utilize our competences, right, which we have gotten because, well, because we by coincidence lives in this country

Kristian Hegner Reinau: So that means that even though there are a couple of hundred kilometers between, then you are close anyway, seen in relation to the Texas corporation.

Engineer: Yes that we are, we can, well we have experienced in other projects, that we have been able to draw, not confidential information, but information which were relevante. Well, it was not so that [NAME OF NORDIC HANDSET PRODUCER] was pouring out their secrets, but well, they tell us some things that they would never tell a Frenchman.

”Engineer: ... det er jo en kulturforskel, så derfor, det er et reelt problem uanset hvordan vi vender og drejer det. Altså det man så kan gøre, man kan gå ned og lobby og snakke med

dem og gøre det klart for dem også. Jamen, når vi engang imellem er i Nice, så kan vi så snakke med de folk, der måske har med de ting at gøre, men det kører meget på, at vi kan ikke antage at vi har den accept til at kunne gøre, gå ind og få den viden. Og det er, hvad skal man sige, det er jo en stærk ting i en vidensdeling, det er også derfor vi står godt i Danmark tror jeg. Som en af parametrene i hvert fald.

Kristian Hegner Reinau: Altså i er bedre til at dele end f.eks. Frankrig

Engineer: Jamen altså, for der er ikke noget, der er ikke noget, du har en reel, det er en reel hensigt altså, du er ikke, altså han vil ikke komme hen og spørge mig med mindre han ville det her, ellers spørger han mig jo ikke. Altså det er ligesom den sang der kører inde i mit hoved. Der kommer en og spørger mig om noget, om jeg muligvis kan hjælpe, jamen så vil jeg da vise der og der, gør sådan og sådan, hvorimod franskmændene vil sige, har han overhovedet lov til det her.

Kristian Hegner Reinau: Hvordan, nu nævnte du kulturforskelle men også det der politik der kører, med konflikter, kan du give nogle eksempler på det eller hvad, hvordan,

Engineer: Jamen konflikter, det kan jo være sådan noget som opgaver, attraktive opgaver, der ligger og hvor man skal ind og slås lidt for dem. Eller sørge for, det kræver så, at man finder de rigtige chefer og allierer sig med, og det kræver også nogle rigtige argumenter. Og nogle gange handler det også om, ligesom i fodbold, bare at stille sig i vejen, for at man ikke kan komme udenom. Altså, i og med at vi bor meget tæt på [NAME OF NORDIC HANDSET PRODUCER] og vi har den samme, altså, den samme måde at kommunikere på, så står vi jo meget stærkt i forhold til, vores firma også, at samarbejde med [NAME OF NORDIC HANDSET PRODUCER], så på den måde, så kan vi jo udnytte vores kompetencer der ikke, som vi har fået, ja fordi vi tilfældigvis bor i det her land.

Kristian Hegner Reinau: Så det vil sige selv om der er et par hundrede kilometer mellem, så er man alligevel tæt på, set i forhold til Texas koncernen.

Engineer: Ja det er vi, vi kan, altså det har vi jo oplevet i andre projekter, hvor vi har kunnet trække, ikke fortrolige oplysninger ud, men nogle oplysninger ud som var relevante. Altså, det er ikke sådan at [NAME OF NORDIC HANDSET PRODUCER] står og udøser af deres hemmeligheder, men altså, de fortæller os nogle ting, som det aldrig ville fortælle en franskmænd altså."

The engineer further explained how he, by knowing the language and sharing the culture, was able to gain information from a person he knew who was working for a large Nordic handset producer, quote:

"There are for example a Finland Swede, and then I know, I have lived in Sweden, so I can also talk Swedish, and thereby I get, I buy a confidence. But also because I really want, well, there is nothing, it is real, I want to talk to him, and a want to make a good connection to him and treat him decent. And therefore, when I ask for something, then I get an answer. And a real answer. But something like that you have to work a bit for." (Engineer)

"F.eks. så er der en Finlands svensker, og så ved jeg, jeg har også boet i Sverige, så jeg kan også snakke svensk. Så jeg, ok, du kan godt snakke svensk, og så får jeg lige, køber jeg lige sådan en fortrolighed. Men også fordi jeg gerne vil, altså, der er ikke noget, reelt, jeg vil godt snakke med ham, og jeg vil gerne skabe en god forbindelse med ham, og behandle ham ordentligt. Og det gør også, at når jeg så beder om noget, og spørger om noget, så får jeg også et svar. Og jeg får også et reelt svar. Men det er jo sådan noget man skal arbejde lidt for." (Engineer)

This makes it interesting to turn focus to the cluster around TIDK, the NorCOM cluster. We have now focused on the culture within TIDK. Apparently the culture among some managers and engineers within TIDK is different from the culture in other TI sites. If engineers within the com-

panies in the NorCOM cluster share the North Jutland mentality described above, regarding help each other etc., then there should be relations between TIDK and its surrounding were engineers and managers within TIDK find support. Let us now turn focus to the localization of TIDK within the NorCOM cluster, and the influence of this cluster upon TIDK through time.

9 The impact of and upon the NorCOM cluster through time

According to a manager, the NorCOM cluster has had an important influence on TIDK through time, because it has been a source of experienced engineers:

"It has on the one side meant everything because I do not think that we would have existed today had the cluster not been here. Had the university not been here. If Cetelco and all the others had not been here. That is one side of it. The other side, that is our emergence, ATL Research and all that, right. But also the development we have been through. It has meant a lot because we would never have been able to get the people, had the cluster not been here. I have always said, the more companies, the more competitors we are up here, I can also call them colleagues, the better the situation, because there have been situations where we really have hired a lot of people, where things have gone upwards, where it went down in other companies, and then we have been able to get people from them. Then when it goes down for us, then maybe they can take some from us, so that way we are safe. What the NorCOM cluster have done is to secure that the right competences are up here, and that is the only thing that matters for Texas being here at all. For Motorola being here, or have been here. For RTX being here. It is the fact that the right people are here with the right competences. And it is the university and the firms in the area that have created this situation. So in that way, it would have been impossible that it was only TI in the area up here, that would never have occurred, then Texas Instruments Denmark would not have been allowed to develop as it has done. It is only because we have had the possibility to do so, because we have been able to get the right people.

"Den har på den ene side har den jo haft alt, hele betydningen, fordi jeg tror ikke vi havde eksisteret i dag, hvis ikke at klyngen havde været til stede. Hvis ikke universitetet havde været til stede. Hvis ikke både Cetelco og hvad de nu hedder alle sammen havde været til stede. Det er den ene side af det. Den anden side, altså det er jo hele vores opståen, ATL Research og det hele ikke også. Men også den udvikling vi har været igennem. Så har det betydet alt muligt for vi har jo aldrig kunne skaffe de folk til og, hvis ikke der havde været det her. Så som jeg altid har sagt, jo flere virksomheder, jo flere konkurrenter vi har heroppe, kan jo også kalde dem kollegaer, jo bedre er det, fordi der har jo være situationer hvor vi har virkelig taget folk ind og vi har, det er gået opad, hvor det så er gået lidt ned i de andre virksomheder, så har vi jo på den måde kunnet få folk derfra. Så når det går nedad for os kan de måske tage nogle fra os sådan at vi sikre hele tiden. Det NorCOM klyngen det har været med til, det er at sikre, at der har været de rette kompetencer der er til stede heroppe, og det er det eneste overhoved der har betydning for at Texas overhovedet er her. For at Motorola overhovedet er, har været her. For at RTX er her. Det er at der er de rette folk til stede, med de rette kompetencer. Og det har universitetet og så de virksomheder der er i omåret været med til at sikre. Så på den måde, så kunne det ikke, det ville være utænkeligt, at der kun havde været TI heroppe, at der ikke, for det vil aldrig være sket, og det vil aldrig. Så havde Texas ikke fået love til, Texas Instruments Denmark, ikke fået lov til at udvikle sig som det havde gjort. Det er da kun fordi vi har haft muligheden for at gøre det. Fordi vi kunne skaffe de rette folk" (Manager)

Another manager explained:

"... it is quite important that you have some competent people. And the people who are sitting in this house, they have been employed in some different firms, and this means that they bring with them knowledge from other firms, where they might have a different way of doing things. And that knowledge bank, you can evaluate you firm on many dimensions when you have to sell yourself, but you can also sell yourself on seniority, on the engineer time you

have, well, the experience you have, management right, and in that regard it is very important that there are some key personal who are not only inbreeding. Well, that they have been out making experiences, feeling it on their own bodies, a company success or actually a company failure, right, so that is a very important factor. So the whole NorCOM aspect etc., now I have not, I have been more externally focused, so I have not got many, well, I have been sitting in on meetings in Aalborg connections, and also in relation to the university, right, which is still important, the university has not disappeared, well, it is still in the consciousness, also out by the large customers in China." (Manager)

"... der er ret vigtigt det er at man har nogle kompetente folk. Og de folk der sidder i huset her har jo været ansat i nogle forskellige firmaer, dvs. de bringer med sig viden fra andre firmaer, hvor der er måske en lidt anden måde at gøre tingene på. Og den vidensbank, hvad skal man sige, man kan jo stille sit firma op på mange målepunkter når man skal sælge sig selv, men man kan jo også sælge den på anciniteten på den ingeniørtime man har, altså den erfaring man har, management ikke, og der er det jo meget vigtigt, at der er nogle nøglepersoner, som ikke bare er indavl, ikke. Altså, de har været ude og opleve på kroppen ikke også, en firmassucces eller en firma nedgang faktisk, ikke, så det er en meget vigtig faktor. Så hele norcom aspektet osv, nu har jeg ikke selv været, jeg har mere været udadvent, så jeg har ikke så meget, men jeg har da siddet med til nogle møder i aalborg sammenhæng, også i sammenhæng med universitetet, ikke, som jo stadigvæk er vigtig, universitetet er jo ikke forsvundet, altså det er stadig bevist også ude ved de store kunder i kina, ikke." (Manager)

The personal network of the employees in TIDK within the NorCOM cluster is for example used when companies close, lay off employees or opens, as an engineer explained:

"...for example when, what is it called, when Sima closed, there were contact immediately from this company, about getting some people in here. So in that way the network is strong, you know who is where, because you can almost trace yourself back to Cetelco, well, many of the people here, they know each other back and forth from Cetelco, and Dancall, and all those. So in this way there still is an informal network, and we could also see that when 60 software people were fired last year, and they started a new company, which has closed again now, but that rumor also spread really fast. You see, we know before Nordjyske Stiftstidende [LOCAL NEWSPAPER] what has happened, so it is difficult to keep in secrets. So there is still floating a lot of information, and I have also contact to several of the old colleagues"

"... som eksempel, da, hvad er det det hedder, da Sima lukkede, der var der jo kontakt med det samme her fra firmaet, med at få nogle af de folk herind. Så på den måde var, er netværket jo stærkt, med at man ved hvem der er hvor, og fordi at man kan stort set spore sig tilbage til Cetelco, altså mange af folkene her, de kender på kryds og tværs hinanden fra Cetelco, og Dancall og hvad de ellers hedder. Så på den måde er der jo stadigvæk et uformelt netværk, og det kunne vi også se ved, da der blev fyret 60 softwarefolk sidste år, og de startede et nyt firma, og det så også er stoppet nu, men det rygtedes også meget hurtigt. Altså vi ved jo før Nordjyske tidende hvad der er sket, altså, så det er svært at holde nogle hemmeligheder inde. Så der flyder stadigvæk mange oplysninger, og jeg har da også selv kontakt til flere af de gamle kollegaer." (Enginner)

An engineer gave an example which showed that the inflow of people from other companies in the NorCOM cluster can support relation between TIDK and other players in the industry, quote:

"Engineer: ... some of the people we have, that is for example former [NAME OF HANDSET PRODUCER] people, who are employed. There have been an [NAME OF HANDSET PRODUCER] site here in Aalborg, and we have been able to draw on that. In the first phase, back when we not really knew anything, then we knew that there were some people who had been there earlier, who could talk to the people up there. We had for example some contractors, who could talk with them about, contractors from [NAME OF CONTRACTOR COMPANY], who had been with [NAME OF HANDSET PRODUCER] earlier. So in that way we could pull in some information that way also.

Kristian Hegner Reinau: Ok, because they knew the organization from the inside

Engineer: Becuase they knew the organization, but they also knew the meaning of some concept which at the time were not clear to us. Not, it was not bit knowledge, but it was enough, what to say, to catalyze it, and then at least get a step further. I don't know how much, maybe we did not save so much time, but never the less, just the fact that you have, at least a place where you could just pose a question and get an answer. It was a luck that we had him here at that moment, the person who knew that, but in that way we have been drawing on the fact that here is a cluster, right."

Enginner: ... nogle af de folk vi har, det er f.eks. nogle tidligere [NAME OF HANDSET PRODUCER] folk, der er ansat. Der har været sådan en [NAME OF HANDSET PRODUCER] afdeling her i Aalborg, og der har vi jo kunnet trække på, altså. I start fasen, der da vi ikke rigtigt viste noget, så viste vi så, der var nogle folk, som havde været der før, som så kunne snakke med dem deroppe. Vi havde f.eks. nogle contractors inde, som kunne snakke med dem om, contractors fra [NAME OF CONTRACTOR COMPANY], som havde været ved [NAME OF HANDSET PRODUCER] tidligere. Så på den måde kunne vi jo trække lidt information ind den vej også.

Kristian Hegner Reinau: Ok fordi de kendte organisationen indefra.

Enginner: Fordi de kendte organisationen, men de kendte også nogle begreber som på det tidspunkt ikke var klart for os hvad egentlig betød. Ikke, altså det var ikke, det var ikke det store viden, men det var nok til, hvad kan man sige, til og katalysere det, og så i hvert fald lige og komme et skridt videre. Jeg ved ikke hvor meget, det har måske ikke sparet så meget tid, men alligevel, bare det at man har, så var der da i hvert fald et sted, man kunne bare stille et spørgsmål og få et svar. Det var så heldigt vi lige havde ham inde der på det tidspunkt den person, som viste det, men altså, men på den måde har vi jo trukket på at der er det cluster her ikke."

An engineer who had worked for another company in the region explained how he used organization knowledge from that company when he was employed in TI to set up a project in way different from what was the normal procedure in TI.

"It was approximately the project I stated with when I came back to Texas. And there I chose a slightly different approach for it that the one which had been used earlier, at least as far as I can sense. What I can just tell about when I was sitting by Infineon is that Infineon is a smaller super tanker than TI is. It is more dynamical and more open to changes that have not been planned. They don't have the same huge plan they work along no matter what. So therefore I, well I know that there are some things which work, so therefore I did things a bit different than they were done historically. At least as far as I, well, what happened shortly after I started here was that the audio expert who were sitting here earlier, he decided to leave, because of other reasons. So that means that I don't know exactly what has been done earlier when you have had a new hardware platform, but I fell that then you have connected it to a standard microphone, and then made some standard measurements. And then you have sort of said, well, the measures are right, well, then we are done. Whereas I have sort of said, well for me audio is more complex, and that I am sure that people are aware about, an the problem is that it can be very difficult, well, how are you to go an validate something which is complex. The problem with the audio is that when you have a phone, well, then you have some audio system, but we don't produce the whole audio system in the phone, we only make the chip and the software sitting in the chip. Then some customers build the electronics surrounding this. Obviously we have a standard for how to do it, but they can easily change it. The customers can choose other speakers and microphones, and they can also change the openings surrounding speakers and microphones, which then influence the full picture. So therefore one can say, that for the sound to be good in the final solution, then it is sort of a combination of what we do and what the customer puts on. You can compare it to a stereo. We make the amplifier, yes, but what is the speakers, what is the wires, is it from a CD, or is it from a MP3 player in which the sound in compressed into pure crab. Is it from a

vinyl record player or from an old cassette recorder. This means that there is a lot of variables which we are not in control of, so therefore I say, that when we do a audio validation of our platforms, then we should rather validate how flexible it is. We should not only measure it in relation to one thing. We have to measure it in relation to some different things to see how it performs, can it work with these.” (Engineer)

”Det var ca. det projekt jeg startede med da jeg kom tilbage her til Texas. Og der valgte jeg en lidt anden tilgang til det end man historisk, eller man havde gjort tidligere, i hvert fald sådan som jeg kan fornemme. Det jeg lige kan sige det er, at da jeg sad ved Infineon, der er det en mindre supertanker end TI er. Den er noget mere dynamisk og den er noget mere åben for at der sker noget som måske ikke lige er planlagt. Man har ikke helt den samme kæmpestore overordnede planlægning som man forholder sig til no matter what. Så derfor tillod jeg mig ligesom at sige, jamen, jeg ved at der er nogle ting der virker, så derfor gjorde jeg noget lidt andet end man historisk havde gjort. I hvert fald sådan som jeg har, nu skete der så det, at ca., kort tid efter jeg startede her, så den, hvad skal man sige, audio ekspert der sad her tidligere, han valgte så at stoppe, af andre årsager. Så det vil sige, jeg ved ikke helt så meget præcist hvad der er sket, men det jeg fornemmer man har gjort tidligere, det er at når man har haft den her nye hardware platform, jamen så har man forbundet den til en standard højttaler mikrofon, og så har man målt nogle standart parametre igennem. Og så har man ligesom sagt, jamen, måler det rigtigt, jamen, så er vi færdig. Pass på det. Case closed. Hvor jeg ligesom har sagt, jamen, for mig og se er audio noget mere komplekst, det er jeg også sikker på det er man udemærket klar over, men problemet kan være meget svært, og hvordan skal man gå ind og validere noget som er komplekst. Det der er problemet med audio det er, at når man har en telefon, jamen så har du et eller andet audio system, men det er ikke os der laver hele audio systemet i telefonen, vi laver kun den chip og det software som sidder inde i chippen. Så er der nogle kunder der bygger noget elektronik udenom. Slvfølgelig har vi en standard på hvordan vi kan gøre det, men de kan sagtens lave det om. Kunderne kan vælge andre højttalere og mikrofoner, de kan vælge andre åbninger omkring højttaler mikrofonen som også påvirker det samlede billede. Så derfor kan man sige, at for at lyden er god i den endelige produkt, så er det ligesom en kombination af hvad vi kan og hvad kunden de putter på. Man kan sammenligne det lidt med et stereoanlæg. Vi laver forstærkeren ja, men hvad er højttalere hvad er kabler, og er det fra en cd er det fra en MP3 afspiller hvor lyden er komprimeret til det rene lort. Er det fra en vinyl pladespiller eller fra en gammel kassettebåndoptager. Så dvs. der er sådan en hel masse parametre som vi ikke er herre over, så der, hvor jeg siger vi skal lave audiovalidering, af vores platform, så skal vi nærmere gå ind og validere hvor fleksibel den er. Vi skal ikke kun måle den i forhold til en ting. Vi skal måle den igennem i forhold til nogle forskellige ting for at se jamen kan den bruges til det, kan den bruges til det, kan den bruges til det.” (Engineer)

To implement his vision the engineer made a group consisting of engineers from different TI sites, as he explains:

”So I made contact to some people who sit in Nice and make DSP algorithms, and some people in India who make multimedia players out there, and I made contact to, there are some local people here in Aalborg who make software tools so that you can control the parameters in the phone. And then we also had contact to some people in France who had made the chip. So thereby I made a small team, it was me who had to do the work, but we had, or well, still have, not every week now though, weekly telephone meetings where we talked about this and that, about what was going on, what problems we had and so on, to avoid that I just sit completely lonesome up here in Aalborg, and just measure the things I have to, and then saying ok. So it is to function together across programs and sites and everything, because the guy in India, who makes software to these multimedia players, well, those multimedia players, Mp3 players, they are not used in this E-costo, they are used other different places. And the guy who makes the DSP algorithms in France, they are also use din different phones.” (Engineer)

"Der gjorde jeg så det, at jeg tog kontakt til nogle folk der sidder og laver nogle DSP algoritmer i Nice, og tog kontakt til nogle folk i Indien, som sidder og laver nogle multimedie afspillere derude, jeg havde kontakt til, der sidder nogle lokale folk her i aalborg som laver nogle software tools så man kan gå ned og styre parametrene i telefonen. Og så havde vi også kontakt til nogle af dem i frankrig som havde lavet chippen. Så der havde jeg sat sådan et lille team op, det var mig der godt nok skulle lave arbejdet, men vi havde, eller har stadigvæk, det kører så ikke hver uge, men sådan et ugentlig telefonkald hvor vi snakker sammen løst og fast hvad sker der, hvad er der sket i, hvad er der af problemer osv., for ligesom at undgå at jeg bare sidder palle alene i verden heroppe i Aalborg, og måler det jeg nu skal måle, og så sige ja det er godt. Så ligesom for at vi skal fungere som en gruppe på tværs af afdelinger og programmer og alt muligt, fordi ham der sidder ude i indien og laver software til det her multimedie afspiller, jamen de multimedie audio afspillere, mp3 afspillere, jamen den bliver jo ikke kun brugt i det her e-costo, den bliver brugt forskellige steder. Og ham der sidder og laver DSP algoritmer nede i Frankrig, jamen de bliver også brugt på forskellige telefoner."

The initiative was his own, quote:

"It was purely something I made on my own initiative. Finding the right people in different places. I normally use the term audio chain, well, who have made the speakers, who have made the speaker cables, who have made the amplifier, and all those people have to be able to talk together. Instead of the guy making the speaker cables just doing this according to his specification and then being done." (Engineer)

"Det var ganske simpelt noget jeg fik sat op på eget initiativ. Få fundet de der folk rundt omkring, som ligesom har været med til og bidrage til den der, jeg plejer at bruge begrebet, sådan audiokæde, jamen hvem har lavet højttalerne, hvem har lavet højttalerkablerne, hvem har lavet forstærkeren, og så alle de folk skal kunne snakke sammen. I stedet for at ham der har lavet højttalerkablerne, jamen det er kun i henhold til de specifikationer han nu har, og så er han færdig." (Engineer)

The important thing to note in this is that what that engineer brought along from Infineon in the NorCOM cluster to TIDK was not only technical knowledge but also organizational knowledge, knowledge about how to organize work within his field in a multinational corporation in a from his viewpoint desirable way. Let us therefore take a closer look on how the NorCOM cluster has been utilized in political games within TI.

One manager said that the obvious and quite simple argument; that TI had to be in the region because other MNCs such as Motorola were in the region, has not been used, quote:

"Well, whether it was Motorola that was here, or it was Infineon that was here, that we could say that, that has not been, well, you would maybe think that it had an influence to say, well the other big ones are here, so we need to be here too. But I have actually not encountered any argumentation using this at any time. Well, it has been because they bought a competence in the shape of ATL right, and that, we have also been a core competence group here. And that has actually been the only thing that has meant anything" (Manager)

"Altså om det var Motorola der var, eller Infineon der var her, eller at vi kunne sige det, det har det sådan ikke, altså man skulle måske nok tro, at det havde betydning, at sige jamen de andre store er her, så skal vi jo også være her. Men det har jeg egentlig ikke mødt nogen argumentation gående på det på noget tidspunkt. Altså det har været at man har opkøbt en kompetence i form af ATL ikke, og det, vi har jo så været en core competence gruppe her. Og det har sådan set været det eneste der har haft nogen betydning" (Manager)

The presence of the other MNCs in the region has on the contrary been used in more "advanced arguments" in political games within TI. One manager explained how he had used the background of the management team in TIDK in other telecom companies in the cluster, which actu-

ally produced whole phones (Dancall and Cetelco) to argue that a form factor solution should be utilized within TI, quote:

"And I will also think that the local area can mean something on the technical side, I have definitely tried to use it. You can actually see here on my second slide [THE MANAGER SHOWS A POWERPOINT SLIDE]. Here I have tried illustrating how many years of experience we have in the management of TIDK alone. It was because it was difficult, it takes a long time if we have to investigate all the employees, how many years of experience they have within telecom, and try to illustrate this telecom experience. So what you see is that there are 408 years of experience in management, and that the 364, which is by far the most, that is from telecom. And then we will try to show that the 237 years are actually from outside TI. And that is to illustrate that we actually came from the handset business, and that we actually know how to make an end product. So that I have used in my argumentation for us making the form factor here, because we have very many years of experience in making an end product. I have not, though, been completely satisfied with the response. Well of course that depended on who I was talking to, because some have looked at it and said immediately, oh yes, that is true, and thereby bought the whole story about telecom valley and this and that, right, while other have been harder to convince. But at least one can say that they had been even harder to convince if I had not had this material, if it has said 10 years instead, right. So it definitely does not have a negative influence, and I have tried to use it." (Manager)

"Og jeg vil også tro på den tekniske side at lokalområdet kan også betyde noget, jeg har i hvert fald forsøgt, og bruge det. Du kan faktisk se det her på min anden slide her [Respondent viser en slide med ansatte og erfaring i TIDK]. Jeg har forsøgt her at illustrere hvor mange års erfaring vi har i TI danmarks ledelse bare. Det var fordi det var svært at gå ud, det tager lang tid hvis vi skal undersøge alle medarbejderne, hvor mange års erfaring de har indenfor Telecom, og prøve at illustrere hvor mange års telecom erfaring der er, og. Så det man kan se er at der er 408 års total erfaring i ledelsen, og de 364, dvs. langt langt det meste, det kommer fra telecom. Og så vil vi så prøve at vise at de 237 år rent faktisk var fra udenfor TI. Og det var for at forsøge at illustrere at det rent faktisk kom fra håndset branchen, og at vi rent faktisk ved hvordan det er at lave et slutprodukt. Så det har jeg brugt i min argumentation for at vi skulle lave formfaktor her. Og fordi at vi har rigtigt mange års erfaring indenfor at kunne lave slutprodukter. Jeg har så ikke været helt tilfreds med responsen på det. Altså det kom jo an på hvem det nu lige var man har snakket med, fordi at der er nogle der har set det med det samme og sagt nå ja, det er jo rigtigt, og altså netop købt hele historien med telecom valley og dit og dat, ikke også, men hvor at der er andre der har været svære at overbevise. Men om ikke andet kan man sige, at de havde jo været endnu svære at overbevise hvis ikke man havde haft det er materiale, hvis der nu havde stået 10 år ikke også. Så det har i hvert fald ikke haft nogen negativ indflydelse, og jeg har forsøgt at bruge det." (Manager)

It is in regard to this argument necessary to note, that the two early companies in the region, Dancall and Cetelco, were very successful in their fields, as one manager from TI explains:

"... if you go back maybe 5, 6 or 7 years, well, then there were maybe around 10 to 15 different [TEECOM COMPANIES IN THE REGION], it was more dynamically, right, there were these small companies. But what has happened, is that either they have been removed from the map, or else they have been bought right. And I think that back in time is one of the most interesting stories, back when Amstrad, Dancall started, right, there are a lot of people who believe, that had they made the right investments and so forth, etc. etc. etc., then Dancall could have become Nokia, and Nokia could have become a wellington factory. As it stated out being. It is a bit of coincidences, right, well, they actually had the possibility, as they were ahead of Nokia back then. We were in Denmark, right." (Manager)

"...hvis du kører jeg ved ikke, en 5 6 7 år tilbage, jamen, der var jo måske 10 til 15 forskellige [Telecom virksomheder i regionen], der var mere dynamik ikke, der var de her små virksomheder. Men det der skete, enten så blev de slette at landkortet, eller også blev de opkøbt ikke. Og jeg synes et af de mest interessante historier helt tilbage i tiden ikke, det var den-

gang amstrad, dancall, startede ikke, der er vi jo mange der mener, at hvis man havde lavet de rigtige investeringer, osv osv osv, så kunne Dancall have været blevet til Nokia, og Nokia kunne have blevet en gummistøvlefabrik. Som den statrede med at være. Det er jo lidt tilfældigheder osv. ikke, men de havde faktisk muligheden, de var foran Nokia på det tidspunkt. Vi var i DK ikke."

It was earlier mentioned, that the presence of other multinational corporations within the NorCOM cluster also was used in the negotiation process surrounding wage within TIDK. On manager explained, quote:

"... when we have to negotiate wage, then it is pretty good that our human resource manager have been over and talk to the human resource director at Motorola, and they have made a mutual statement on how they see the wage development in this area. Then he can go, when it is negotiated how many percent we shall have in 2008, and tell that, and that is incredibly important. I mean, he could also have gone over and talked to RTX, I don't remember if he did that, but he has done that sometimes, but, now RTX is relatively known around the world, so it can mean a little, that they know that there are 200 people at RTX and that their wage increases such an such. But it means ten times more with Motorola. They know Motorola, it is an American company, and so and so, so they feel safe, right. So there is different advantages of having more multinational corporations in this area, it supports TIDK in relation to the rest of TI. There is no doubt about that." (Manager)

"...når vi nu skal forhandle løn ikke, så er ret godt at vores personale direktør han har været ovre og snakke med personale direktøren ved Motorola, og de har lavet en fælles statement på hvordan de ser lønudviklingen her i området. Så kan han gå til, når der nu skal forhandles, hvor mange procent skal vi nu have for 2008, at han kan fremføre sådan noget, det vægter utroligt meget. Altså han kunne jo selvfølgelig også være taget over og snakket med RTX, det kan jeg ikke huske om han gjorde men det har han gjort nogle gange, men, og nu RTX er sådan rimeligt kendt ude i verden, så det kan godt have en sådan, betyde lidt, at de ved at der sider 200 mænd ovre ved RTX og deres løn stiger sådan, og sådan, men det betyder 10 gange mere med Motorola. De kender Motorola, det er et amerikansk selskab, og sådan og sådan, så føler de sig trykke, ikke også. Så der er forskellige fordele ved at have flere multinationale selskaber i området her, det styrker TIDK i forhold til resten af TI. Det er der ikke noget tvivl om." (Manager)

Another top manager also explained that the NorCOM cluster played a role in negotiations about the future work tasks in TIDK:

"Kristian Hegner Reinau: Well then, if we look at the situation today where you are in charge of TIDK, and you are making these negotiations about what should be done where and what should the future be like, does the NorCOM cluster play any role in this, or does it influence that TIDK is located here,

Manager: Yes it does to the degree that I find for the rough plans we have now, for 2009 and beyond, I see that the right expertise profile is here in the NorCOM cluster, they have expertise how to build phones, how to generate a platform, a mobile phone platform. This does mean that they have some basic knowledge about the underlying communications system, and know how the limitations of a real production. This is key today, because not the cost of the components is relevant, only, but also contribution of implementing it on a single PCB, printplade, and testing and calibration related. This is an expertise you find not at any place. Here I think they are quite strong, and there is a second aspect which is that a lot of activities, there is one big customer, two big customers here around, in the Nordic space, and your NorCOM is quite close to both of them.

Kristian Hegner Reinau: Who Is that

Manager: Nokia and Ericsson, I mean it is not a secret, they are very close here, they have even development sites in Copenhagen. So, I mean, it's perfect."

Another example from a manager interview is, quote:

"I can also mention another thing, where I have mentioned NorCOM recently [INTERVIEW TOOK PLACE IN END OF 2007] where we are trying to pull a large American company to this region, to some measurement equipment, where we have pulled NorCOM up of the hat, and told a lot about it. And I also know that there have been meetings with NorCOM in that regard. But well, it is a completely different case. It is not because TI is trying to get that company to come here, it is more an interest from TIDK, we would like there to be more electronic companies in the region" (Manager)

"Jeg kan da lige nævne en anden ting hvor jeg har nævnt NorCOM her for nyligt i øvring, hvor vi forsøger at trække en stor amerikansk virksomhed her til området, til at lave noget måleudstyr og noget, hvor vi da har hevet NorCOM op af hatten, og fortalt en masse om det. Og jeg ved også der har været møder med NorCOM i den forbindelse. Men det er så en helt anden sag. Det er ikke fordi at TI går specielt efter at skulle have den virksomhed her, det er mere interessen herfra TIDKs side, at vi kunne godt tænke os at have flere elektronikvirksomheder her i området" (Manager)

The quotes show that the NorCOM cluster and its characteristics are used in the political games within TI. An important thing to note is that it is especially the presence of other MNCs within the cluster that are important for the arguments. This is because those other MNCs and TI are all big organizations, and therefore have a number of organizational issues in common. Especially the American organizations within the cluster can support each other, because they share some of the same challenges being parts of American corporations. One example is, as a manager said, to give each other moral support:

"Well for example, if nothing else, then we can give each other moral support, when we are sitting and trying to cooperate with the university. There we can apply larger pressure to get some flexibility from the university, or maybe from institute of technology, because we are maybe three companies who say the same thing, we cannot sign this contract, even though it seems strange, and even though we know that what we want to change has no meaning whatsoever, but now it is like this because we are an American company. And when we sit all three and say the same thing, Or sometimes we have been a bit lucky and got our lawyers to think a second time, if there is something where for example Siemens have agreed on something, which they can approve, then sometimes they have looked again, because that they cannot understand, because Siemens is normally really tough in that area, and then sometimes that can make them think again and maybe approve the contract also. So in that way we can put some pressure on the very stiff and formal organizations we are part of. We can maybe make them a bit more flexible by helping each other. And especially if we cooperate with people we like. Well, TI like [NAME OF HANDSET PRODUCER THAT HAVE BEEN IN THE REGION], and [NAME OF HANDSET PRODUCER THAT HAVE BEEN IN THE REGION] likes TI. We are cooperating. [NAME OF HANDSET PRODUCER THAT HAVE BEEN IN THE REGION] is our customer, but TI is also to an extent customer by [NAME OF HANDSET PRODUCER THAT HAVE BEEN IN THE REGION] on some projects that are running. So companies, when they globally have a good relationship with one another, then we can use that locally. Because, also with the lawyers again, oh, it is the same with [NAME OF HANDSET PRODUCER THAT HAVE BEEN IN THE REGION] right, well, we have a lot of agreements with [NAME OF HANDSET PRODUCER THAT HAVE BEEN IN THE REGION], right. Well, it is not. Just signing a Non-Disclosure Agreement in TI, that is a huge project, which have to go through a huge approval process, well, it is practically impossible to sign a Non-Disclosure Agreement in less than three months. So anything that can help soften this up, or make it possible to maybe utilize an existing agreement, that is a bit help" (Manager).

"Jamen f.eks. så har vi, om ikke andet så kan vi give hinanden moralsk opbakning, når nu vi sidder og forsøger at lave et samarbejdsprojekt med universitetet. Der kan vi ligge et større pres på at få noget fleksibilitet fra universitetets side, eller måske fra teknologisk instituts side, fordi at vi sidder måske tre virksomheder der og siger det samme, at vi kan altså ikke skrive under på den her kontrakt selv om det virker tåbeligt, og selv om vi ved at det vi gerne vil have ændret, det har i virkeligheden ikke nogen som helst praktisk betydning, men det er altså nu engang sådan fordi at vi er en amerikansk virksomhed. Og når vi sidder og siger det alle tre. Eller nogle gange, eller, vi har kunne være lidt heldig også, med at få vores advokater til at tænke sig om en ekstra gang, hvis nu pludselig at der er et eller andet hvor at Siemens f.eks. har sagt ja til, at de kan godt acceptere det, som det ser sådan ud her, så har de nogle gange siddet og kikket, det kan de godt nok ikke forstå, siemens de plejer at være rigtig hårde på det område der, og sådan, så kan man måske få dem til at tænke sig om en ekstra omgang, og måske kunne vi også godt acceptere det. Så på den måde, ligge lidt press på de der meget stive formelle organisationer vi sidder i. Vi kan gøre dem måske en lille smule mere fleksible ved at hjælpe hinanden. Og især så hvis vi arbejder sammen med virksomheder som vi godt kan lide. Altså TI kan godt lide motorola og motorola kan godt lide TI. Vi har samarbejder, Motorola er vores kunde, men ti er faktisk også i et eller andet omfang kunde hos motorola på nogle projekter vi kører. Så virksomheder, der når de globalt set har et godt forhold til hinanden, så kan vi udnytte det på lokalt plan. Fordi også igen til at advokaterne åh er det sammen med motorola ikke også, jamen, der har vi jo mange aftaler med motorola ikke. Altså der er ikke. F.eks. bare det at få en NDA skrevet under i TI det er jo et stort projekt, der skal igennem en større godkendelsessløjfe, altså det er stort set umuligt at få en NDA skrevet under på mindre end 3 måneder. Så enhver ting, der kan hjælpe til at bløde et eller andet op, eller sikre at der måske er aftaler på plads i forvejen man kan lukre på eller sådan noget, det er en stor hjælp" (Manager)

This similarity issue also means that the relations between TIDK and smaller companies are few according to a manager. This is because small companies and their ways of working are very different from TI and TI's way of working as a multinational corporation. Therefore it can be challenging to create interfaces that make relations function between small companies and TI.

If we look deeper at the information from the cluster utilized within TIDK, then we can distinguish between two types. Information managers obtain and use in their job, and information engineers obtain and use in their jobs. This is not two clearly separable types of information. To illustrate this using a thought example: if one engineer in TIDK obtains technical knowledge about a given technology used in another company in the cluster, and use it to make a technical solution, then the information about the other company utilizing this technology can maybe tell a manager in TIDK about the functions in the phone, the engineers in the other company are working on, and the manager might use this in managerial work, i.e. should TI also look into this.

From a manager perspective the information from the NorCOM cluster is not very important anymore.

"I will say that the need for this extraversion is not so large anymore locally, unfortunately. Well, in the Aalborg area. It simply is not. It is out in the world that we have to be careful that we do not lose the grip, because or else companies in India, in China, will emerge which can do the same as us at a lower price. And then we are out of the game. It is there, well that is one of the absolutely, well, that is very dangerous. It is something we have to take seriously, right, it was not like that 5 years ago." (Manager)

"Jeg vil sige, der er ikke behov for den store udadvendthed så meget mere, desværre, lokalt. Altså i aalborg området. Det er der altså ikke. Det er ud i verden, vi skal passe på at vi ikke mister taget, fordi eller så opstår der firmaer i Indien, i Kina, som kan det samme som os, til en lavere pris. Og så er vi out of the game. Det er der, altså det er en af de helt, altså det er

farligt, det er noget vi skal tage seriøst ikke, sådan var det ikke for 5 år siden altså." (Manager)

An engineer, who had worked for TIDK, then left and worked for Infineon in the cluster, and then returned to TIDK told the following:

"You can in general say that of course you talk with your old colleagues and study friends etc. in the Aalborg area. And you can talk with them about technical issues to a given point. But when it becomes concretely about something your company is underway with, then you do not talk to them, because that is somehow industrial secrets. Well Infineon and Texas are competitors, and of course I have a lot of knowledge from Infineon [THE INTERVIEWRESPONDENT HAS BEEN EMPLOYED AT INFINEON EARLIER] which I cannot disclose in Texas, and the other way round with people changing the other way. Due to the fact that we have, what shall I say, a tradition for a lot of clauses etc. in the area, well, then you have to have a certain professional attitude in regard to what you can and cannot do." (Engineer)

"Man kan sige generelt er det sådan her i Aalborg området, at du snakker selvfølgelig med gamle kollegaer og studiekammerater osv. Og du kan også snakke med dem til et vist punkt omkring sådan nogle tekniske ting. Men når det er helt konkret med noget som dit firma har på vej, jamen så snakker du ikke med dem om det, fordi det er jo et eller andet sted industrihemmeligheder. Jamen altså Infineon og Texas er konkurrenter, og selvfølgelig har jeg en masse viden fra Infineon som jeg ikke kan lukke ud i Texas selv om det vil være en fordel for Texas, og omvendt, folk der skifter den anden vej. Så det er jo den der professionelle holdning, du, man er nødt til at have til sit job. I og med vi ikke har, hvad skal man sige, tradition for en masse klausuler osv. i området, jamen, så er man nødt til at have en vis professionel holdning til hvad kan man tillade sig og hvad kan man ikke tillade sig." (Engineer)

Another point regarding information search is, that seen from an engineer's perspective, an issue is to learn where to find information, and this is a competence an engineer builds through time. A large issue in this regard is to figure out how it functions in the given company where an engineer is employed, and this is important because such information cannot be found elsewhere, as an engineer explains, quote:

"Part of the experience in the business is that you learn where to dig up different information. But, what shall I say, the biggest piece of work is actually to get hold of how it works inside the company you are working for. Because when you have to start testing something technically etc., well, then the problems you typically encounter is something about how it is implemented in the given company. A general information about say Mp3 decoding is rarely relevant, because it is normally not the general that is the problem. It is always some small stupid things and, well, do you deliver the right or the left data first. And then it is a good thing to have a hold on it. Just like that classic story, there were a space mission where some different people had worked together, and some had implemented it in meters and others in feet and inches. Well none of them had made an error as such, there was just a small detail not fitting together. And that is typically the issues we are struggling with when we are testing whether things work. Here when we sit in the end and have to make sure that things play together." (Engineer)

"En del af erfaringen i branchen er jo også at du finder ud af hvor du kan grave, stampe forskellige informationer op. Men, hvad kan man sige, det største, det største stykke arbejde er egentlig at få styr på hvordan fungerer det indenfor det firma du nu arbejder i. Fordi altså når du skal i gang med og teste et eller andet teknisk, osv., jamen så er det, de problemer du typisk støder på, jamen det er et eller andet, noget med hvordan det er implementeret i det pågældende firma. En general information omkring MP3 dekodning f.eks. er sjældent relevant, fordi, jamen det er egentlig ikke det generelle der er problemet, det er der som regel styr på. Det er altid sådan nogle små dumme krøller og, jamen, leverer du dataene til højre først eller dataene til venstre først. Og så er det smart at man ligesom har styr på det. Ligesom den

der klassiske, der var en eller anden rum mission hvor der var nogle forskellige der havde abrejdet sammen, og nogle havde implementeret det i, efter metersystemet og andre havde brugt tommer og fod. Altså der var jo ikke nogen af dem der havde lavet nogen fejl som sådan, men der var lige en detalje der ikke hang sammen. Og det er typisk de ting vi egentlig slårsser med når vi sidder og tester om tingene virker. Her når vi sidder ligesom i den sidste ende og skal finde ud af om tingene nu også spiller.” (Engineer)

Basic technical knowledge, which is often not the problem, can be search different places within and outside TI, whereas the concrete knowledge is searched internally in TI:

”Places on the internet, places, what can one say, colleagues in different places who have knowledge if it is something that I don’t understand, well then I can ask around for something specific technical issue. When it is a matter of whether left or right data comes first, then it is, what to say, internal Texas people I need to get a hold on. So the basics, well that I can search for in different places, but as soon as it is something concrete around something in the Texas system, well, then it is different places within Texas” (Engineer)

”Steder på internettet, steder, hvad kan man sige, kollegaer rundt omkring som har en viden hvis der er en eller anden krølle jeg ikke selv lige har styr på, jamen så har jeg nogen jeg kan spørge rundt omkring omkring et eller andet teknisk specifikt. Når det kommer til er det høre eller venstre data der kommer først, jamen, så er det, hvad skal man sige, interne texas folk jeg skal have fat i. Så det basale, jamen det kan jeg søge rundt omkring, men ligeså snart det er det konkretene omkring et eller andet her i Texas systemet, jamen, så er det rundt omkring i Texas.” (Engineer)

The engineer later gave an example of what a search for general knowledge could be, quote:

”...if I am missing some information about something, and know that Søren Hansen in another company, well, they have such a measurement tool. If I have to sit and investigate whether we should have a new measurement tool, which should be able to measure this thing, and I have an eye on some measurement tool from some company, and say, is this good or bad and how is the support from the company, etc., well, then I know Søren Hansen, somewhere in another company that have this tool. Then I can call and talk to him in a general way and say, this measurement tool is that good, does it work, is it stable, and so forth” (Engineer)

”... hvis jeg sidder og mangler en eller anden information omkring et eller andet, og ved at Søren Hansen i et eller andet firma, jamen de har sådan et målesystem, hvis det er jeg skal sidde og undersøge om vi skal have et nyt målesystem, som skal kunne måle det her, den her parameter, har så kik på et eller andet målesystem fra et eller andet andet firma, og siger det her målesystem, er det godt eller er det skidt, og hvordan er supporten fra dem som firma, osv., jamen så ved jeg at Søren Hansen, de ovre i et eller andet andet firma der har de det her målesystem, jamen så kan jeg ringe og snakke med ham sådan generelt og sige, det her målesystem er det nu godt, virker det, kører det stabilt, er, og hvordan og hvorledes.” (Engineer)

The challenge in searching for knowledge is therefore different for TIDK engineers than it was for ATL Research engineers. ATL Research was relatively small, and engineers in the company knew one another and what knowledge one another possessed. Therefore it is likely that they often had to look outside the company for knowledge. Engineers in TIDK on the other hand is part of a company employing several thousands of engineers around the world, and therefore it is a challenge simply to find the knowledge within the company. It is here relevant to ask how engineers know what knowledge is confidential and what is not. Apparently this is something the engineers learn though time, and not something stated clearly in rules etc. One engineer explained when ask how he judged whether a given knowledge was confidential or not:

"Well there is, we probably have an office somewhere where you can ask about such things, but it is a matter of hunch for the issue. So, well, is it something that have been known for many years or is it something that we are working on which is relatively new. So it is a matter of hunch" (Engineer)

"Jamen det er jo, vi har sikkert et kontor et eller andet sted hvor man kan spørge om sådan nogle ting, men eller er det sådan fingerspitzegefühl, så, jamen er det her noget som har været kendt i mange år, eller er det her noget vi roder med nu som er relativt nyt. Så det er, det er baseret på fornemmelse." (Engineer)

The engineer later said during the interview, that he had never asked anywhere in the organization whether a given piece of information was confidential or not. Another issue that influences the search for knowledge outside TI is the export control TI is subjected to because of American law. An engineer explains:

"Then there is another issue, and that is that we have a lot of, due to the fact that we are an American organization, then there is a lot of tight rules about export control. And that is both applying to software and to knowledge, it applies to hardware, it applies to all sorts of things that are sent out of this house, it has to go through some legal test, and there is a lot of issues we have to be aware about. But due to the fact that I do not have a lot of contact to the outside, that means outside TI, most people I work with is inside TI, due to the fact that we are all TI employees, and then there are no problems in that. It starts in the moment that you have to go to the customers and talk to them, and then you have to know how much you can say and how much you cannot say." (Engineer)

"Der er så en hel anden ting, det er at vi har en hel masse, i og med vi er en amerikansk virksomhed, så er der en hel masse stramme regler omkring eksportkontrol. Og det gælder både software, og det gælder også viden, det gælder hardware, det gælder alt muligt der bliver sendt ud af huset hvor det skal igennem sådan en eller anden legal test, og der er en hel masse ting vi skal forholde os til. Men i og med jeg har ikke ret meget kontakt udadtil, dvs. udenfor TI, de fleste jeg arbejder sammen med det er indenfor TI, i og med vi alle sammen er Texas ansatte, jamen, så er der ingen problemer der. Det er først i det øjeblik at du ligesom skal ud til kunder og snakke med dem at du skal vide, jamen hvad må, hvor meget kan man sige og hvor meget kan man ikke sige." (Engineer)

Here we should remember the earlier quote, where an engineer explained that in his eyes, this rules did not really apply within Denmark, because there was this Danish culture of sharing knowledge. A tendency with is, refer to the discussion about the mentality in North Jutland, possibly quite strong in the NorCOM cluster. Let us therefore end this section with a quote by an manager and engineer in TIDK who in 2008 still have contact to some people within the NorCOM cluster whom he knew from his work at Cetelco years earlier Cetelco.

Manager: ... you don't have to tell what it is you are working on. It could for example be the layout program you work on. If there is a function that I cannot figure out how to use, then I can call I contact I have, in another company, and get help there.

Kristian Hegner Reinau: Ok, do you do that sometimes

Manager: I could do that, and there is also some who calls to this place.

Kristian Hegner Reinau: Ok, also from NorCOM companies

Manager: That could be, yes.

Manager: ...man behøver ikke fortælle hvad det er man sidder og arbejder på. Det kunne f.eks. være det layout program man sidder og bruger. Er der en funktion man ikke kan finde ud af, så kan jeg godt ringe over til en bekendt jeg har, i et andet firma, og få hjælp der.

Kristian Hegner Reinau: Ok, gør du nogle gange det

Manager: Det kan jeg godt finde på. Og der er også nogle der ringer her.

Kristian Hegner Reinau: Ok, også fra NoCOM virksomheder,

Manager: Det kunne godt være ja."

10 The End

The previous chapters have described the changes in the organization of TIDK, changes in management practices within the company. They have discussed changes in the work of the engineers working for TIDK as well as changes in the technology they were working with and changes in the market they were supplying. The sections have focused on the political games that have shaped TIDK through time, and the culture of the people within TIDK and participating in these games. And finally the previous section has discussed how the surroundings of TIDK, the NorCOM cluster, have influenced TIDK. It is therefore time to present the end of the story now.

As discussed in section 7, some employees in TIDK felt that they had been pushed away from some of the work areas they believed ought to be theirs within TI through the political games and the organizational changes etc. taking place. In interviews conducted in august and September of 2008 some engineers told that they felt that TIDK had ended on a sidetrack within the TIDK organization, or as a satellite, as the following quotes show:

"...well, the consequence is that we have fewer areas to focus on. And that is hopefully putting us in a position to do a better piece of work in these areas. But at the same time we have become a bit detached. Detached in relation to a lot of things. Well, it is so a lot of that task we are working is done in France on chip level and also a small part in Dallas. Whereas if you focus on a OMAP, a pure OMAP, a high-end, then it is all done in Dallas. One can say, however you twist and turn it, then it is they nice site with more than 1000 employees that are the focal point in Europe, and we are just a small satellite in comparison."

"jamen det gør jo, at vi har færre områder at fokusere på, og det gør forhåbentligt, at vi kan gøre et bedre stykke arbejde på det. Men samtidigt er vi også koblet lidt bedre af, koblet af på mange af de ting. Altså, det er sådan, at den del vi sidder med, der bliver meget af det lavet i Frankrig på chip niveau, og en lille del også i Dallas. Hvor hvis du går over på en OMAP, en ren OMAP, en high-end, så bliver det hele lavet i Dallas. Man kan sige, hvordan man vender og drejer det, så er det Nice siden, med over 1000 ansatte som er omdrejningspunktet i Europa, og vi er en satellit at betragte i den sammenhæng."

"Due to the fact that it was smaller, then it was easier to influence things, and we were sitting as a fairly competent part of it all, what should I call it, of the package. Now, as far as I can tell, we have in Aalborg been run out on a siding. And maybe we have gotten further out on that siding through the years. This is not the center of the development." (Engineer)

"I og med det var meget mindre, så var det meget lettere at påvirke tingene, og vi sad som en rimelige kompetent del af hele, hvad skal man kalde det, pakken, hvor vi, så vidt jeg kan fornemme, så er vi her i Aalborg blevet sådan kørt lidt ud på et sidespor. Og måske gennem årene er kommet lidt længere ud på det sidespor. Det her er ikke centrum for udviklingen." (Engineer)

An top manager told in an interview at the same time, that he felt that things were starting to change in TIDK, that TIDK needed to focus on new areas, such as other wireless solutions than

GSM, for example Bluetooth and wireless LAN, and that engineers within TIDK were starting to understand this and things therefore TIDK were changing slowly in the right direction, so to say:

"..that's the experience I made now here in Aalborg, once you start the train and it is slowly rolling, you feel that more and more people jump on it, and they put in ideas. I mean these people are anything else than stupid, they see, oh its maybe new, but it seems interesting, so I cannot do this or that, but suddenly, oh wireless LAN, Bluetooth, GPS, oh yes, why not, it is a new system, and they get curious. And curiosity is very important for engineers, so they jump on it, and this makes the thing moving, you don't need to push so you get pushed, and this is what I prefer, I get, I rather have the people pushing me forward than to be in this pulling situation" (Manager)

An event taking place the 22th of October 2008 tells that apparently the feeling found among some engineers, as described above, was true in the end. This day it was made public in the local newspaper that TIDK was put up for sale by TI. A top manager from TIDK explained the following in an interview two days later:

"TI has a strategy, you know that, and TI has a focus on areas of growth, and these growth areas they are not in the modem business anymore, you see that the modem basis is going to be saturated, it is a commodity, it is not differentiating anymore, but still we need to invest a lot of money, to keep track of the technology. And there are other areas like the smart phone area, where you have application processors, and even connectivity, wireless connectivity, which has a high potential of growth. Today, it is a guess, maybe roughly 20 percent you can count to the smart phone segment. And this is 20 percent of one billion dollars, and the expectation is going to grow to 2013 to far beyond 50%. So what you are doing if you cannot invest in everything, money is short, and you need to focus on one of the areas. And let other companies do what they focus on. Which could be something, for instance, the modem part." (Manager)

"What you find in the press is that, it's basically what they say, there is a commodity modem, meaning that is the modem we sell to the broad market, TI, we call it chipset, and TI want to discontinue that. And the good option is to sell the whole business with the related IP and the people, and so on, to sell the whole segment. We call it GGE, GSM, GPRS, EDGE. What is still in, you find that also, what is still in the portfolio of TI is the application processors, the wireless connectivity and ASICS for Nokia.... This is customized chips for Nokia, and these may include even the modem." (Manager)

The sale described influenced five TI sites around the world. Some was put up for sale completely, such as TIDK, while only parts of others, such as TI Nice, was put up for sale. As it can be seen from the quote, the considerations leading to this decision in TI draws relations to issues discussed earlier, for example the changes in technology and markets for these technologies as well as the competences found within TIDK, the organization of work within TI and how TIDK fits into the corporation and finally the political struggles for tasks within TI.

Approximately three months later, on Tuesday the 27th of January 2009 it was announced in the local newspaper, as well as other medias, that the effort to find a buyer for TIDK had been without success, and that it therefore was decided to close TIDK and lay off all the employees. This marks the end of the story about the company Texas Instruments Denmark A/S.

Chapter 7: Texas Instruments Denmark from the Outside

(This chapter comes from a document which has been cleared for publication by TI. Therefore I have been unable to change anything in it, and therefore when sections are mentioned it refers to sections within this chapter. "Section 1" thereby refers to the section "1 A successful acquisition" within this chapter. This is also why the numbering is not made with the chapter number as the beginning as in other chapters in this thesis)

Last chapter told the story of TI Denmark seen from within TI Denmark. To elaborate on the dynamics behind the changes we saw in that story I will now focus on TIDK as it were seen from the outside, i.e. how TIDK were seen from other sites within TI. Since TI Nice played a key role in the story about TIDK, I will predominantly focus on how TIDK was seen from TI Nice. Further, I will add the view from TI Dallas since TI Nice, TI Dallas and TIDK formed the main sites within the RF field, the field forming part of the core competence in TIDK.

There were different views upon TIDK from different sites. Basically each person within TI had their own view upon TIDK. This chapter is not meant to give an overview of all these different views upon TIDK, an impossible task. The goal of this chapter is to elaborate upon the story told in the chapter "The Story of TIDK", and this will be done by presenting the views of a handful of managers and engineers from TI Nice and TI Dallas, who through their work were in close contact with TIDK, and because of this are able to tell the story of TIDK as seen from the outside.

One might ask, what is scientific the value of telling this story, or rather these stories, as they are seen from 2 managers and 5 engineers from TI Nice and 2 managers in TI Dallas? The value lies in the fact that these people are chosen as respondents because they, through their work tasks and organizational positions within TI, constitute a group of people who were in a position where that meant that they had a view upon both what was going on inside their own site as well as in TIDK, and hence are able to tell about differences between the sites. And through understanding these differences we can get a better understanding of some of the dynamics causing the changes we say in the story of TIDK.

This chapter is going to tell the story of how these people in TI Nice and TI Dallas saw TIDK. Before beginning on this story, I will like to say that I do not personally agree with all the views upon TIDK which will be presented in this chapter. But it is necessary to present these views upon TIDK, as they were seen from the persons in TI Nice and TI Dallas, so that it in later chapters is possible to analyze the story of TIDK.

To understand the different views upon TIDK as seen from the outside, let us start by focusing on the broad lines in the TIDK story, i.e. the acquisition of ATL Research and its consequences seen from TI's point of view.

1 A successful acquisition

Seen from the position of a manager in TI Nice, the European headquarter of TI, who were involved in the acquisition of ATL Research in 1999, and later located above TIDK organizationally within TI, the story of TIDK from the acquisition in 1999 to the closure ten years later should be seen as a story about a successful acquisition. He explains:

"...we need to look it overall now, and you know this is our difficult day, because, you know, there is some restructuring going on and almost finalizing TIDK, and by the way, it's not only TIDK the restructuring is as we speak in Nice, there are 305 people that are going to be fired

next week by the way, so it's a difficult environment, but, if I look at this TIDK overall, we need to smooth a little bit the ongoing environment. This has been a success. So, you know, there are not, there are not so much examples of successful acquisitions in companies, you know, and, because acquisitions are very complex. Personally I think it has been a success. It has been a success from this standpoint because this was a good deal for both companies, this has been a success, and of course there have been some problems, I know, between TIDK TI France, and Dallas and so on. Ok, I'm not telling you that it was, it has been easy, but I think it has been a success in terms of business. Delivering to customers what they wished. The, TIDK has been key in some relationship aspects with [NAME OF NORDIC HANDSET PRODUCER]. This is very important, and I think it has helped a lot, because I think culturally I have seen that there were things happening between TIDK and [NAME OF NORDIC HANDSET PRODUCER], that were making sense. And again I understand them, you know it's probably [NAME OF NORDIC HANDSET PRODUCER] culture is closer Denmark culture than French culture. So it has been a success with a lot of customers. That is what I want to summarize. TIDK can be shown, can be shown as a very successful acquisition example in TI. And ok, for me difficult to say, because the end of the story is not nice, but still, still I want to mention this, that ok, strategically now we, TI have changed it focus, you know TI is now focusing on analog and embedded application processor solution. Big change, and TIDK is suffering a lot, because of this decision, and not only TIDK, TI France and others, but that doesn't prevent me to tell you that this have been a very successful acquisition story. And is acknowledged as been a successful acquisition story." (Manager TI Nice)

To understand this view, let us go back to the reason for the acquisition as seen from TI's viewpoint. In the chapter "The Story of TIDK" we heard about these reasons from the viewpoint of one of the founders of ATL Research. The TI Nice manager describes it as the following:

"I been involved in this acquisition, just to give you an historical perspective here, we did develop what we call chip set solution in TI for GSM, we have n this chipset solution, this was baseband process at the very beginning, and this product went on the market in handsets, went in the market in the late 90's let say, 1998 I don't recall this time frame. And at that time we had no RF in our portfolio, and we had questions around the RF, we had to support customers who wanted to connect our baseband solution to RF, and we had a lot of questions around this support wise, business wise, because we wanted customers, we had customers that wanted us to come with them with these schematics including the RF, system schematics which were similar to handset, to help them, and with support on the PCB. And then at that time we had the visit of company ATL that was proposing partnership to develop what we call reference design. And at that time ATL was looking for baseband partner, that was seen their side, was discussing with us and was looking for a baseband partner. At that time I think [NAME OF FOUNDER OF ATL RESEARCH] was competing with another design, but he was willing full to fund a baseband partner to help him develop reference designs for customers that was looking for this kind offer. And then we went through some conversation, some meetings with them, and we found an idea on our side to invest in this domain, and we found the idea that it could make sense for TI to make the acquisition of this company. And as a matter of fact ATL went, were open from the very beginning to this idea, my decoding of this is that ATL at the time was looking for, you know, a future business, and possibly was not experiencing issues, but was coming to a situation where they had to make certain decisions in term of investments and so on, so I think this came perfectly at the right time, and it was a good solution for both ATL and for TI. And then we went into due diligence, we went to you know looking at the assets, so on, on my side I have been in charge of the technical aspects of the assessment, and of course there has been a discussion from the business stand point, and then it went to an acquisition, that according to me have been very successful, because you know, not all acquisitions are successful. It is a matter of big challenges, and this was a successful, I think it was a good deal, dollar wise for both sides, so it was an acquisition which was good for TI and I think good for ATL at that time. So again the vector, that, did, was good for TI at that time, was to gain expertise at RF level, at BOM level and at system level, to support customers that wanted to use our chipset as the baseband chipset in their phones. And behind this there was of course the beginning of an overall

strategy in this business which I would call the ODM strategy, and it was pivotal for us to have such offer in our products for, for ODM like business...

...And ODM business was meaning also very customer support structure and then with ATL we rapidly found, that they were already supporting some customers, so they had the practice of doing it, and then this gave birth also in TIDK of this second activity which is customer support solutions delivery centric. I think I noticed in TIDK two kinds of mission, one which is R&D centric, in order, relying on skills to develop the PCB to look at certain issues in the handset, calibration issues, manufacturing issues, and I think the second activity which is more customer centric in order to support the customer up to ramping their phones." (Manager TI Nice)

According to the manager the idea of acquiring TIDK was easy to sponsor within TI at that time, quote:

"At that time there was no, it didn't go to a bit challenge within TI at that time, it was a time where we wanted to invest in system solutions, it was the time decisions were easy to be done because they were among very few people, it was still at the beginning of wireless journey, so decision went very fast and again I don't know the details of the deals, and I cannot disclose them in any way, but the deal itself was a good deal. Was a good deal for both companies, so it was, regarding dollars, it was really an offer able story coming at the time we wanted to invest and it was, so it was, it was not, it was not so difficult to sponsor the idea and to get the approval of such concept." (Manager TI Nice)

So in 1999 the idea of acquiring the competences found in ATL Research was easy to sell within TI. Let us now jump to the end of the story. We know the end of the story of TIDK as seen from within TIDK. Let us elaborate on this by adding the view from TI, the TI Nice manager explains:

"...To make it short, because we go from the beginning to the end of the story, the end of the story went in a different direction. It is not related to the skills I would say, in the meaning that I think that the skills of the engineers in TIDK are acknowledged and key skills. We may ask our self if we did everything to grow these skills, but, ok we have not gone in details in such, on this, and we will not do it, it was, ok, it is over now, but I have not the feeling that we did miss an opportunity to grow skills or to adapt skills, this is my perception, this is my judgment, but I may be wrong, some people will tell you other and I would respect this. So it went in a different situation. To make it brief, it went in this direction, because TI from strategic angle took the decision that the product, the products, that were developed through these channels, and not only what was TIDK doing but the development of the ICs, of the software, the development of such products was not, let's say, aligned to our internal investment model. That means our margin of profitability on return of investment. Why, because this was in the addressing market segments which are more lo-end, and that is not a surprise that for lo-end margin are getting always smaller, so this is, and then based on these observations TI took recently the decision to focus on application processor type of products. That are, you know, targeted for smartphones, MID, you know all these types of market segments which are emerging. Because we see here better margins, better return on investment. And for this reason we had to make choices, and we, because unfortunately we cannot do everything, and we make the choice to focus on this type of product, and to de-in-phase, first a little bit, but in the end we are de-in-phasing totally, meaning stopping, development efforts on conventional chipsets I would say. What we call previously baseband chipset, or sometimes we are calling modem chipsets, having in mind that we don't do only modem, because they are to be equipped with some audio and some features, multimedia features and so on, but more targeted to lower end market segments. This is the big rationale. Of course the current alignment from economics is not helping, but it has not been the structuring rationale of the decision. Of course it is not totally a surprise, that this decision is coming at the same time there is an economic crisis, but the decision was not driven from an economical standpoint like reducing the headcount to reduce the expenses and so on. This decision

which was taken in October was really done from a strategic angle. And, that's for the brief explanation of the end of the story." (Manager TI Nice)

So we might ask: If the market did change, so that in the end of 2008 there were no longer any business in the area where TIDK operations belonged, why did TI not see this come earlier? Why did TI for example not change the work areas of TIDK, and other sites within TI, earlier to avoid having to close the whole of TIDK, as well as part of other TI sites in the beginning of 2009? According to the manager from TI Nice there are several issues to consider. Firstly, as he stated in the quote above, he does not see the outcome of a sign that TI did not manage to grow new skills at the given sites. He sees it rather as the result of changes in the market, which was difficult to foresee for TI, and resulting strategic decisions at high level in TI, as he explains in the following:

"There are few things which have happened in this market where, which were not a vision frankly speaking. These last year there has been very very, there have been a lot of changes, and some of them are including our customers. One of them as an example is [NAME OF HANDSET PRODUCER]. [NAME OF HANDSET PRODUCER] was, and still because we still are selling these products to [NAME OF HANDSET PRODUCER], but [NAME OF HANDSET PRODUCER] was a key customer around this strategy, and unfortunately you may look at [NAME OF HANDSET PRODUCER] tryings over the last three year. [NAME OF HANDSET PRODUCER] has lost shares, I don't know where they are now, but I think they have gone below the 10 percent, has lost share. And [NAME OF HANDSET PRODUCER] was a key structuring customer for our activities including ODM and so on. So it is just to mention to you one example, that are things that have happened, that unfortunately, and that were not predicted in the meaning that strategically wise it's, we make this decision to focus as an example on this customer so. Just to mention that there have been a lot of things happening. Now still, can we blame our self's from a management perspective that we didn't, we didn't predict everything, and so on. Yes ok, I may wish to put myself in the people that can blame themselves, but frankly speaking, I will not blame myself because, ok you know that it's an environment, TI is a courageous company when it deals with taking tough decisions. So of course there are some difficult aspects around it, but, ok, that is a way to move faster. So it was not a vision that this market segment would collapse so rapidly, that was not predicted, so. Now skill wise, we make the deliberate choice, and I think it was a good choice so, you know, I cannot predict everything, it make a good choice to, because we need also to focus area of expertise, in some key locations you know. It is not our culture to make every design center in TI being capable to do everything, that is not a good strategy either. So we make the choice to focus TIDK skills around this type of products, and this make the success of TIDK And this made also the success of the engineers, and this market segment for 15 years have been key market segment for TI, so. You know it is a difficult, always a difficult choice between focusing the teams and making speculations about the future. But we make this choice and I think this was the right choice because I don't think that at any time we had waste of R&D investments in TIDK. It has always performed at speed, it has always performed in an optimal way, so as a delivery machine the R&D has been, I would say, overall successful, of course there are always some areas that could have been better but, as executed rightly." (Manager TI Nice)

There are two interesting issues in this quote. The first is that TI did not see some of the changes in the market in the years leading up to 2009, and these changes lead to the change in strategy of TI and the following abandoning of the business area forming the basis for the activities in TIDK. The second issue is that TI has a strategy of building different competences in different sites. This was, as the manager explains, what caused both the success and fall of TIDK. The success in the years where the RF competences etc. found within TIDK constituted a key resource in one of the business areas of TI. The fall of TIDK when these competences were no longer needed within TI, due to the new business strategy.

From this overall discussion, one might get the impression that ATL Research was acquired by TI because of some specific competences, and fulfilled a function within TI with these compe-

tences from 1999 until 2009, where these competences were not longer needed by TI anymore. But such a view ignores all the changed that actually occurred in TIDK specifically, and in TI in general, in these years. The chapter "The Story of TIDK" showed that a number of things changed in TIDK in these years, for example in relation to management practices and the organization, as well as in relation to the technology forming the fore of TIDK and the market served by TI and hence TIDK. Having now sketched the rise and fall of TIDK within TI shortly in overall terms, as seen from TI, let us now turn to the changes that occurred within TIDK and how these and the dynamics behind them was seen from TI Nice and TI Dallas.

2 Changes in TIDK seen from TI Nice and TI Dallas

We saw in the chapter "The story of TIDK" that from the acquisition of ATL Research in 1999 until the closure of TIDK in 2009 the company changed along several dimensions. This makes it interesting to investigate how these changes were seen from TI Nice and TI Dallas, to elaborate our understanding of these changes and the dynamics behind them, and hence the changing behavior of TIDK through time.

Seen from the viewpoint of the manager in TI Nice, who were involved in the acquisition of ATL Research, ATL Research brought new skills into TI. It was therefore relatively easy seen from a managerial perspective to fit ATL Research, and hence TIDK, into the portfolio of TI. He explained, quote:

"I mean, it has been easy, because I explain from the very beginning ATL did join TI bringing new skills, new area of expertise, new type of R&D expertise in the journey of developing you know. This what we call reference design, which at the end of the day from a engineering standpoint are boards, schematics, PCB structures, layout structures, simulation of the PCB, putting the ICs on the PCB making some verification, looking at manufacturing issues, calibration issues, and some areas of compliance, by applying system tests, activities to make some tests at system level. So making these activities, area of skills TI was not equipped with, so that, from this standpoint, I think the acquisition was easy, and the merging with TI from this standpoint was the easy part, because the guys were not coming with, from TIs angle, with skills which were already in TI, which were in competition within TI and so on." (Manager TI Nice)

This does not mean that there was no friction in incorporating ATL Research into the TI Corporation, as the manager elaborates:

"... there were few issues technically which have been a challenge from the very beginning. But again I would calibrate this as being second order of magnitude you know. But still very important, because it is always the details which are causing the integration issues, the relationships between engineers and so on. So this has been very important, even it was not in term of quantity, in term of the main activities. What has been, from the very beginning, and all along, that means all along the life of TIDK, difficult aspects, has been all what was related to make it simple. That was to the software, this has been difficult, this has been more challenging, for several reasons, I would say. First of all because there were some kinds of, some overlap there, in some activities. Ok, there was from the very beginning, from the beginning, a strong, and for very good reasons, a strong wish of TIDK to grow in this domain, and again for very good reasons. And software by definition is not an easy journey, because at the end of the day, when you develop software at different level in different sites, sometimes you might have difficulties for the ones with the ownership of all the software, and this can get very messy, so again, several reasons. It is because the domain of software is not an easy journey when it is distributed. Second wise because there were some overlaps, even it was small, because TIDK was developing a little bit of software. And third dimension is because for very good reasons TIDK wanted to grown in this direction, and from the very beginning had strong expectations. And this part of the journey of TIDK have been less, have been more difficult. All along the story of TIDK, because you know, TI has to make choice around the

software development centers, and you can imagine the situation was not so easy, was fragmented, there was Berlin [I.E. TI SITE IN BERLIN] that went through an acquisition of Condat, which was looking after the protocol stack. There was Nice [I.E. TI SITE IN NICE] who were developing the layer one software. There was then TIDK that was bringing some I would say driver software driver I say. And then in our journey we went also in developing software in India for some services and some functions, and in Dallas, and probably I may forget another development center. So the picture around software has been very distributed, and has been always a challenge for acquisition, and especially TIDK, because I think TIDK may have, may have the, rightfully the impression they, in this journey, they have been a little bit constrained. One rationale being that it has been for us a big challenge with this fragmentation of software development for solutions.” (Manager Ti Nice)

This fits with the story seen from TIDK view. We saw in the previous chapter how one of the managers from TIDK told that he felt, that the infusion of Condat software people never gave TIDK the results it should have done, because of, as he expressed it, quote, “... these external circumstances that kept putting obstacles in our way”, i.e. decisions and organizational changes within TI that limited the synergies between the software and hardware engineers within TIDK. It is here interesting to note that this can also be understood in the way that the manager in TIDK saw TI as a development house, which should have had all the competences to create a phone, as he argued, quote:

“Because to make a whole phone, and be a whole system house, then you have to have all the competences. And except layer 1, we had some protocol stack people, who were former layer 2 people, but we were missing a little around layer 1 and DSP, but apart from that we had competences in largely all areas, when we got the Condat people.” (Manager TIDK)

However, as mentioned by the manager from TI Nice, it has not been TI's strategy to make every TI site capable of doing everything, which might have caused TIDK to feel a bit constrained in this issue.

Another area in which TIDK has experienced challenges through time has been in relation to the RF competences. The chapter “The Story of TIDK” told how the struggle with TI Nice amongst others have influenced this work area in TIDK, which at the time of the acquisition constituted one of TIDK's core competences. Seen from the TI Nice manager, the RF competence within TI, and the role of TIDK in this competence, has evolved through time:

“The RF area has been, first I think that have been several steps. The RF area at the very beginning, you know TI had no RF so basically what TIDK did bring to us, was the capability and the expertise to connect cable of RF from the market, that was not TI, to our baseband chipset. That was unique skills, and it went I think, wild you know. Now the story went a little bit more difficult when TI did develop its own RF. For several reasons, the first one is that TIDK was still very busy you know, busy as usual developing, supporting customers, still developing solutions with the non TI RF. And at the very beginning TI wanted, and have been successful by doing, to develop our own RF. And of course TIDK wanted to join this activity, so. Ok, I think, my perception is that this has been probably seen by TIDK as difficult in some circumstances, because, the design teams has been located in Nice, of the RF transiver, have been located in Nice for a long time, or, and in Dallas. And TIDK was part of the story, but I suspect if you ask that through some interviews, I suspect that they may have found sometimes difficult to find a room among these three parties. For some good and bad reasons, because you know, it is always easier when you have to deal with engineers which are on the same site, so there was an RF activity in Nice and of course designers were, for them it was easier to and simpler to discuss with some RF experts that were in Nice, and so from time to time, we had to remind them, that they had to discuss with their TIDK colleagues, so it is not. It is not politics, in fact it is way of doing things, which are sometimes making things simpler. And you know, having, even the distance between Nice and TIDK is small, you know, it's still

a distance, by doing, it is not so, this is created, I know them because you know I am a manager of these activities from the very beginning of the story, it has, it has resulted from time to time in some frustrations I can suspect.” (Manager TI Nice)

The point that the situation regarding the RF competence within TI changed from a situation where TIDK was the center of the RF competence within TI, to a situation where TIDK had to struggle to find its place within TI regarding the work on the RF solutions, was also supported by one TI Dallas manager. He explained that in 2008 the DRP team in TI Dallas had become the center of the RF competence within TI, quote:

“I think, I think the DRP team, so the radio team here in Dallas created, maybe a misconception, but at least they created a conception of source, that for all RF issues, we were the go to guys, we were the experts. And I believe it was a misconception, but I, that was created, I don’t exactly know how. But at least, whenever there was an RF issue of any sort, the DRP team was the de facto guys to go to. And then, and that meant then that the RF expertise in Denmark got overlooked quite often.” (Manager TI Dallas)

Another TI Dallas manager did not agree completely with this view, i.e. that TIDK had lost its position as the center of the RF competence to TI Dallas though time, because in his view the two sites possessed different types of RF competences, as he explains in the following quote:

“I’m not sure I agree on that [THAT TIDK WAS THE CENTER OF THE RF COMPETENCE WHEN ACQUIRED BUT HAD LOST THIS POSITION TO TI DALLAS BY 2008], because TI in Denmark had RF experience at the board, the PCB, design level. Whereas TI in Dallas had the RF expertise’s at the chip design level. I don’t think that it was ever the case that it was expected that TI in Aalborg would design chips, it was expected that they designed the boards that chips go on. So in my view that remained constant over time that the Aalborg RF expertise was on the board level and designing boards. Dallas expertise was designing the chips” (Manager TI Dallas)

So according to one view TIDK had in 2008 difficulties finding its room within the RF work area in TI, which had probably lead to frustrations in TIDK. According to another view TI Dallas had by 2008 created a conception, and maybe a misconception, that TI Dallas was the center of the RF competence within TI which caused the competences of TIDK in the RF field to be overlooked. According to a third view there were different types of RF competences in TIDK and TI Dallas. We should here remember that one of the reasons why TI acquired ATL Research was this RF competence. It is therefore interesting to ask the following question, if we are to understand the changing nature of TIDK through time and its behavior: How did TIDK lose its position in TI as the center in TI of the RF competence? This is, as the chapter “The Story of TIDK” showed, not the only change that occurred in TIDK through time, but giving the importance of the RF competence at the time of the acquisition, I will use the RF area as a starting point to investigate how TIDK changed through time as seen from the outside, and what dynamics that caused these changes, as seen from the outside of TIDK.

Having chosen this RF competence as the starting point, it is also necessary to mention briefly, that the position of TIDK as center for the RF competence was apparently not the only position within TI lost by TIDK by 2008. Seen from the outside, TIDK was actually struggling to find its place within TI in 2008, and people from TIDK were in 2008 trying to figure out what work tasks they should take care of within TI. A manager from TI Dallas, who was responsible for the radio performance on some of the projects within TI, explained the following in an interview:

“That then means that then I became responsible for the radio performance... ..So that means I needed to, every time I had a problem, I would need to interface with either the SOC team in France, or if it was more the application level, then it would be the application level

team in Denmark. Because I spoke Danish I was the natural candidate to become a pretty tight connection between here and Denmark. And I used that quite extensively, and I think TIDK also. They knew I was using them because I spoke Danish, and I went there very often, to give them a bigger pile of the tasks, because what they were actually struggling for throughout 2008 was defining their role in the world wide team. And I had many discussions with [NAME OF TOP MANAGER IN TIDK], their new director, with what is going to be TIDKs role moving forward, what is. When you talk about, when you talk on a VP [SORT FOR VICE PRESIDENT] level inside TI, what do they know TIDK for doing, and to be honest throughout 2008, nothing. And that is why they shut them down.” (Manager TI Dallas)¹⁴

This might be putting things to sharply; the manager from TI Nice located above TIDK organizationally stated in an interview that the higher management in TI was well aware of the work areas and competences of TIDK. Nonetheless, interviews conducted in TIDK in 2008 also suggest, that it to some extent was uncertain what was going to be TIDKs core competences and work areas moving forward. As an example, the manager leading the RF engineers in TIDK stated in an interview in 2008, quote:

“...When people out in the world is in doubt to what they are actually doing in Denmark, ok, that they had apparent not heard about, well, then the professional pride of course also decreases, because then you are worth less in the organization. So you are more dispensable. And therefore I sometimes think, well ok, if they want to, then they can just close down this site. That they can just do, it is 130 people, but what is it we can do that the other people cannot do. The only thing we have as a core competence right now that is to make printed circuit boards for phones right, but how good are we at that, you can ask afterwards, how good are we. That the question you ask yourself, are we so good, that we could not be replaced with somebody else. Or do we have so much knowledge that there is no other who can obtain that knowledge relatively fast and so forth, right” (Manager TIDK)

So what caused TIDK to lose its position as the center of several core competences thorough the years 1999 to 2008? Why did TIDK lose its position within TI as the center of the RF competence? What dynamics caused this change? To create a view upon this, let us take point of departure in the quotes by the two TI Dallas managers above.

One of the TI Dallas managers argued that it was different RF competences that were found in TIDK and in TI Dallas by 2008. This view relates to the issue of the changing nature of the RF technology, which were also discussed in the chapter “The Story of TIDK”. Here it was discussed how an integration process occurred in the RF field which caused the IC design competence to become more and more important through time, and hence the RF competences found in TI Dallas to become more important for TI. Another TI Dallas manager explained:

“...so before 2005, it was not a fully integrated radio, it was a baseband processor and then a radio product by a third party, say [NAME OF SEMICONDUCTOR COMPANY] or [NAME OF SEMICONDUCTOR COMPANY] or somebody, that was what TIDK, that was their core competence right. Taking a baseband processor and integrating it with a radio transiver and getting all the t’s crossed and the i’s dotted, right. And the problem came, that the DRP was integrated in the baseband processor. Fully integrated, there is no more integration. But then the problem suite changed, because then you had a non qualified transiver and you had to make it work. Right, where the TIDK folks they would take a prequalified transiver and integrate it with a baseband, and then get the rest of the problems for, the integration problems to go away, right. But they, they were really good at it right. They had lots of, at the time I joined at least [2005], they had lot of 2,5G and 3G solutions running with TI baseband processors in

¹⁴ The manager was Danish and educated at Aalborg University where he graduated in 1995, after which he moved to USA and got job there. He was hired by TI in 2005 in Dallas, and had therefore never worked in TIDK (or Denmark).

the market. [NAME OF BASEBAND PROCESSOR], a separate baseband processor called [NAME OF BASEBAND PROCESSOR], had a [NAME OF SEMICONDUCTOR COMPANY] or [NAME OF SEMICONDUCTOR COMPANY] transiver on it, and it was being sold in large quantities. But then the DRP team was targeted to take the [NAME OF BASEBAND PROCESSOR] baseband processor, and then integrate our transiver on the same dye. And then make it a product. So, yes, I think the problem was that the problem statement or the problem changed. It wasn't TIDK integrating anymore because we had done that. The DRP team had already fully integrated it. The problem was that it didn't work, right, so we still had RF issues. So there we needed their expertise, in getting us over the finish line. So then it became a little bit of a different relationship, because we knew how our radio worked, and didn't work, and they knew how it was supposed to work. And then we had to get a relationship started there, and trying to get our chip over the finish line, into the goal, and sometimes it was a struggle, right. I think that maybe. I think that that actually maybe is the root cause of the mire right, is that the problem statement changed on them." (Manager TI Dallas)

It should here be noted, that apparently TIDK were working on state-of-the-art projects technologically in this configuration between TIDK and TI Dallas in the last years of the company's history. The TI Dallas manager explained that one of the last projects running in the DRP group in Dallas, and hence in TI Dallas and TIDK, was the E-Costo project. This project, which was also mentioned in the introduction to the chapter "The Story of TIDK" was the closest anyone, according to his knowledge, had been of producing a truly digitally defined radio¹⁵, quote:

"Manager TI Dallas: ... we [DRP TEAM IN TI DALLAS] probably had 75 or so working on that one chip [E-COSTO CHIP] at any one time, it was a major effort. So the RF front end, what we did was, is more than just that, it's a quad band receive, a quad band transmit, it has all the down comers, it does everything down to actual bits, and its then pushing the bits into the baseband processor which is collocate don the same dye. So, and inside our RF front end we had our own processor and then we had all the down convertible channels, lo channels and ...

... And I believe, and its, I think we have to go and research that a little bit, I believe it is the most highly integrated RF front end ever devised. GSM radio that is GSM compliant.

Kristian Hegner Reinau: So it's the closest to the DRP that anyone has ever got.

Manager TI Dallas: I believe so yes. And I know for a fact that there is a, so UCD in Dallas has continued to use the chip for a completely different purpose, they are using it for, what is it called, Police, and that kind of stuff, where they are running at a different frequency with a different modulation scheme. And we are just being reprogrammed, so it is, it is actually a software defined radio to the point where it can actually be used at a different frequency with a different modulation scheme and it will do all right."

He further explained that this use of the E-costo chip in the UCD unit was temporary development work, because the E-Costo project had been shut down completely by TI, the DRP team in Dallas dissolved, most of its members laid off and that the E-Costo chip would never be produced.

This issue of changing technologies and hence changing RF competences needed in TI is apparently only one side of the story, because as argued by one of the TI Dallas managers earlier, a conception were created in TI, and maybe a misconception, about TI Dallas being the center of the RF competence within TI, which caused TIDKs competences in the field to be overlooked. This TI Dallas manager, who hired by TI in 2005, also saw the outcome of the Story of TIDK as partly due to a change in management within TI, partly due to TIDK being unable to make an impression upon this new management. This point towards TIDKs involvement in political

¹⁵ The TI Dallas manager was interviewed in marts 2009.

games, or lack of the same, being an issue also in understanding why TIDK lost its position as the center of the RF competence within TI. Let us therefore focus upon the behavior of TIDK within political games within TI.

By combining the view upon TIDK given by the two TI Dallas managers with two TI Nice managers' views upon TIDK, a picture emerges, which can help to expand our understanding of the dynamics that shaped the story of TIDK. These dynamics relate especially to the issue of political games within TI and touches also upon the issue of TIDK culture.

One of the TI Nice managers stated that one thing that characterized TIDK within TI was a naïveness, and that this naïveness was slowly killing TIDK. For example in political games where managers from TIDK had acted to naïve. The other TI Nice manager did not see the behavior of TIDK as being naïve, but on the other hand he believed that what had characterized TIDK were several issues, amongst which being a lack of leadership, and together these characteristics had maybe worked against TIDK within the TI organization.

Let us therefore look closer at these views upon TIDK. The point of looking at these views is that by taking these two views upon the story of TIDK and combining them with observations from the engineers in TI Nice and managers in TI Dallas, it is possible to create a nuanced picture of the story of TIDK and the dynamics shaping this story. The goal is not to judge which of the views that are true or not, if any, rather it is to show the variety in the two different views upon TIDK and to elaborate upon this variety by combining the views with observations made by engineers in TI Nice and manager in TI Dallas, and thereby create a nuanced understanding of the events shaping TIDK through time. The views of the two TI Nice managers will in the following sections function as a guideline which will guide us through a discussion of a number of characteristics of TIDK, as they were as seen by people outside TIDK.

3 The characteristics of TIDK as seen from TI Nice and TI Dallas

As an introduction to the two TI Nice managers view upon TIDK, let take point of departure in the struggle to get work tasks within TIDK. As mentioned earlier, TIDK was struggling to make themselves visible within the top management of TI through 2008, and one TI Dallas manager explained:

“...that struggle was continuing, but I think we were actually carving out, through 2008 we were carving out some, some significant things that got attributed to both myself and also to the TIDK team. And I think [NAME OF SENIOR VICDE PRESIDENT] who is the senior VP there, he has mentioned them a couple of time, where he says, there were some very good progress on some, some system wise debugging and RF performance issues, that he had seen. But then of course he cancelled the whole team, so. So I think we actually would, if it would have been continued, I think we would have a pretty good 2009, we had a very very strong team” (Manager TI Dallas)

Since TIDK was involved in a struggle to get tasks in 2008 we can ask the question: How was the relationship between the sites within TI? According to the manager from TI Dallas, the relationship between the three main sites in relation to the RF competence, TIDK, Ti Dallas and Ti Nice that is, was rather strange in his view, when he joined TI in 2005:

“So when I joined in 2005, and, it took me about a year or so to get my own footing, but in 2006 and end of it, I noticed a very very strange relationship between Dallas and France and Dallas and Denmark...

... To the point of, I had some conversations, and then I got some middle level managers coming kind of, and yelling at me a little bit, for talking in Danish to somebody, and getting in-

formation to leak out underneath the table, because we were under a lot of pressure. Everybody was under a lot of pressure to get the two previous programs out....[NAME OF PROGRAMMES]... There was a lot of tension going around, and it was not a good relationship that had been build. The way it was being controlled, as far as I could see back then, was that France was in control. And Dallas was an IP delivery, we would deliver some intellectual property which was the radio. And then Denmark was an integration house. They would integrate the whole thing on a nice PCB, and they would do the system level tests. The problem was that France was also doing system level tests, and they never really agreed on the results, so they were throwing fireballs up and down the European continent. And then France and us, we also had a quit strange relationship, because we also did not agree on the results, and we were also throwing fireballs back and forth. So it was, there was not a cohesive working relationship, we spent a lot of time just arguing I think, in 2006 and 2007. And then in 2008, I, so TIDK never reported directly into Dallas. Never, they always reported through, they always reported through Nice, but I talked enough to the a couple of guys from Nice that I was allowed to travel to Denmark directly, and talk and engage with them directly, and I got them on board and they were I think very successful through 2009, in getting some, especially these descents and spurs, we were very successful on that and that we did without Frances intervention at all. They read, had no inputs, and kind of just step back and let us run the show. So that was an effort between Denmark and Dallas directly. Even though there were no organization lines between, it was a cross organizational lines relationship. And [NAME OF VICE PRESIDENT], so that level, senior VP level, they strongly encourage that but they also acknowledge that it is sometimes very very hard to build. And, but, so. And I think we got recognized for building a good relationship there and getting some good work done. And also the firebombing just stopped, we actually worked together instead of just throwing fireballs across the ocean, but it was pretty nasty in 2007.” (Manager TI Dallas)

So in the account of this TI Dallas manager there had been a rather strange relationship between the three sites from 2006 to 2008, characterized by overlaps and political games, i.e. fireballs being thrown back and forth, but this disappeared towards 2008. However, according to other interviews conducted in TI Dallas, TI Nice and TIDK, the overlaps were never resolved, and stayed an issue until the end of the story. Let us therefore take a closer look at these overlaps and political games.

As we saw in the chapter “The Story of TIDK”, it is a fight to gets tasks within TI, and a manager from TI Nice with 15 years of experience within TI explained that there were overlaps between all TI sites, quote:

“....there was some overlap. And overlap is in any duration, that is, sometime there were in TIDK, they were trying to do things, that were done somewhere else. And sometimes it was in TI France that they were trying to do things that was done in TIDK. Or sometimes it was in TI Dallas, that they were stating to do things that was done historically in TIDK. So this is not only TIDK issue, this is an overall overlap.” (Manager TI Nice)

According to this TI Nice manager the issue of overlaps between different TI sites, and sites trying to do tasks already done at other sites to get these tasks, was normal within TI. As an example of such he mentioned the task of board production in TIDK. As we saw in the chapter “The Story of TIDK”, TIDK at a time came under pressure to produce boards of good quality in large numbers, and were struggling to do so. The top manager at TIDK at the time explained in an interview in 2007, that this pressure had been the consequence of a new management structure in TI, where people not familiar with the wireless field had come in charge. Seen from the TI Nice managers view the challenge was a matter of politics from TI Dallas, because TI Dallas wanted to produce boards independently of TIDK. He explains it the following, quote:

“It is in TI wireless, classical, you know for example TIDK is the center of excellence for making boards, these boards are used for our software team, and for our customers, to integrate

and validate our software. There was some politics at a point of time, about four years ago. There was a group in TI Dallas that was always claiming to the management that they were late in their deliverables, because the boards coming from TIDK was not stable, were coming late, they did not get enough, so it was just a bad political game, and behind that there was simply the willingness to make their own boards themselves, and not being dependent from TIDK. And in the 3G program it was reaching a point where we were in a real real big, the program has been canceled, we were in a real big problem. Where on a point of time, there were all the software development that was based on the platform, and all the hardware and RF validation that was based on another platform from TIDK. The customer were asking us, well guys, what are you doing, because you know from making a phone, what is really really important, is this platform, reference platform, and it was really killing ourselves. We were going to have execution issues, and probably we were going to face some delaying in the execution, because of this internal fight.” (Manger TI Nice)

So according to this TI Nice manager the reason for the challenges was a political game within TI about what sites that should do which tasks, in this case TI Dallas wanting to be independent of TIDK and produce their own boards. It is therefore tempting to ask oneself whether the fact that TIDK lost its position as the center of the RF competence within TI had something to do with political games. To investigate this let us focus closer on how the two TI Nice managers view upon TIDK.

3.1 One TI Nice managers view upon TIDK

This TI Nice manager, with 15 years of experience in TI, explained that from his view, the main difference between TI Nice and TIDK was that TIDK was naïve in their culture, quote:

“I would say that northern culture is much more open, and I would say, somehow a bit naïve in the sense that as they are open, sometimes they put problems on the table that they should address differently. So, they are a bit naïve, in that sense. Also, that was I would say, the main difference.” (Manager TI Nice)

According to him, this naïve culture showed at both engineering level and management level. At engineering level it showed in the documentation that was produced. The quality of the work conducted by engineers in TIDK was high, but the TI Nice manager had to filter the documentation before it was presented for customers, because of what he saw as a naïve way of putting all issues on the table, in relation to customers. He explained, quote:

“Manager TI Nice: In general at engineer level, the quality of the deliverable was higher in TIDK [COMPARED TO TI NICE AND TI DALLAS]. I think the, in general I do not want to be, appear to strong, but in general, there was in the presentations, in the way of presenting the outcome there were, it was better. There is an effort to explain things. But back to the kind of naïve approach, in the report were there would have been some problem that we were understanding so. So in general I have to do more filtering, more work on the presentation because they, in a way they were putting all the problems on the table, and they were putting, they should, if we should communicate like that, you can get the customer very anxious about your capability to make a solution working. So you know sometimes, when you are developing high technology it is not working over night. We have a validation cycle that can take 9 months to a year. So the way we explain our results, the way we explain our problems, is something we pay a lot of attention to. And TIDK in general, they don’t, they less pay attention to that. Which is another approach of explaining the stuff, but what is really behind that in my view, is that when you explain the problem to a customer, either you don’t know what is going on, and the customer in general say ok, so you have a problem, I would like to have conf call and you explain, so explaining to quickly things to customers is just increasing your work load.

Kristian Hegner Reinau: Ok, is that different in Dallas or in Nice, when people make documents and stuff.

Manager TI Nice: So what is different is that, by nature we are used to think about the way to present to customer problematic things, so that they are a bit less naïve in the approach, but, sometimes the quality is a bit less.” (Manager TI Nice)

It is worth to note here, that the other TI Nice manager, whom I shall return to later, told that he had to filter the TI-internal statements made by TIDK to remove naïve statements that could cause problems if they reached the higher management in TI. The openness of TIDK was also seen on an engineering level from TI Nice, as I shall return to later. Regarding the comment in the quote about the quality of the deliverables from TIDK we can here draw a line to the chapter “The Story Of TIDK” where it was discussed that engineers from TIDK apparently was proud of what they were doing, and valued the technical level of their work. Let us therefore dwell shortly with the pride of engineers in TIDK and the quality of the work in TIDK. The TI Nice manager who did not see TIDK as naïve stated regarding the pride of the engineers in TIDK that it was higher than elsewhere in TI, which fits the findings from the chapter “The Story of TIDK”, quote:

“One basics also which is very important, and I can, I have used from time to time, and also potentially is based on the culture, is I found these people, you know, extremely proud of what they are doing. Ok, you are going to tell me every people is proud of what they are doing, but, I can tell you, when TIDK had done some mistakes, and like every people, you know, it is not, I don’t know anybody who is not doing any mistakes, but when TIDK have done mistakes, and when you are able to show how damaging these mistakes are, I have seen a reaction which is very very fast and when you look at, when you tell this positive ego of the people, I can tell you they feel bad because really they discover that they have made mistakes, I can tell you how fast they react and how proud they are to make sure that this never happens again and so on. That is true for a lot of set of individual people, that is especially true of, or that was especially true in TIDK.” (Manager TI Nice)

The observations of TIDK being open and proud of their work fits with the following view from a TI Dallas manager, who told that engineers from TIDK like to share their work, but they prefer that it has reached a certain quality level before they share it:

“I would say it can be a little bit harder to get information from a Danish engineer in terms of that they prefer that the work is to a certain quality level before they share it with someone else. And sometimes in the US people share information earlier on in the process and it’s not as mature. From TI Nice it can be difficult to get information unless you meet them face to face, or go talk to them, as they do not share information that easily.” (Manager TI Dallas)

Turning to the issue of quality a TI Nice manager gave the following view upon the quality of the work in TIDK, quote:

“...there are some differences, if you compare let’s say maybe French to French or French to Denmark, I’d say that French to French, may be in term of execution quicker but less quality, this is what I would say compared to Denmark which is maybe, take a bit more time, but better quality. If I needed to have, say, a very high level comparison, this is what I will say” (Engineer TI Nice)

The engineer also gave a view upon the quality of TIDK compared to the quality of American TI engineers:

“The American, to be honest, I would say that, again this is not to let’s say, give Denmark some positive, I do not have anything to gain here, but I would say that the overall average

engineer qualification for Danish engineers is higher than the US one. Again considering the same types of teams. Considering same types of activities. (Engineer TI Nice)

Seen from a TI Dallas manager, TIDK and TI Dallas engineers were on average equal in quality, the difference being the spread in the quality, as he explains:

"They are very equivalent. I think maybe the spread here in Dallas might be a little bit bigger. I have seen some engineers here in Dallas at a level that would not be acceptable to be hired in Denmark. And then I have also seen some people here in Dallas that was just in a different plane of thinking. We have, they, we have quite a few, inside the DSP team we had quite a few distinguished members of technical staff. And they don't become that out of chance."¹⁶ (Manager TI Dallas)

Let us now return to the notion of TIDK acting naïve according to one TI Nice manager. According to him the approach of TIDK, which he termed naïve, was slowly killing TIDK. In his view TIDK had acted too naïve in political games and this had lost TIDK its reputation and work tasks to other TI sites. As an example he elaborated upon his view of the political game surrounding the issue of board production in TIDK.

"Manager TI Nice: ... so I started to feel the political game and I discuss with some managers in TIDK, and I explain them what is going to happen. And they didn't trust me, so why they didn't trust me, because in their mind, they were, TIDK was the center of excellence for making reference design, and it was not possible for them to think, that somebody could have the guts to say, no no, I'm going to do my own boards.

Kristian Hegner Reinau: Ok

Manager TI Nice: So they don't trust me, and this is to me a kind of naïve approach.

Kristian Hegner Reinau: So does that mean that they just said well, we do this good, and then don't go into discussions about it more than that, or.

Manager TI Nice: Yes, and then they realized too late.

Kristian Hegner Reinau: Ok you said they realized too late, did they change that during the time, or did it stay the same.

Manager TI Nice: They change the time with regard to the boards because they were obliged to. At a point of time the situation reach a point where, whereas at the beginning they were center of excellence for making boards, now they [TIDK] were in a position to explain to the management why the management has to keep TIDK making boards, why it was interesting. So from being in a position of being leader and being recognized as center of excellence, they were now in the position to struggle to convince the management that the management should not stop the production of boards in TIDK, because they can do it. They can do it as good as what they are doing in Dallas. So they were, it was a fight for death. So they, of course they had to change it [DELIVERY TIME ON BOARDS]. But I would say it's too late because,

¹⁶ It should here be noted that it could have been interesting to compare the technical level among different TI sites using TI's internal measurement scale for measuring engineering talent. This scale consists of 6 steps. The first being MGTS, Member Group Technical Staff, a status which is awarded to 14 percent TIs engineers. The next step is SMTS, Senior Member group Technical Staff, approximately 2 percent of TIs engineers get this status. The third step is DMTS, Distinguished Member Technical Staff, which is awarded to around 0,1 percent of the engineers. Above these three level are the three levels TI fellow, senior TI fellow and principal TI fellow, and engineers reaching the principal TI fellow will be in a position where they will argue directly with the CEO of TI about where TI should go etc. Unfortunately the organizational changes in TI in the beginning made a comparison impossible of technical level of the different TI sites using these categories for this study impossible.

because of their attitude. At the beginning they were naïve, now they had to defend themselves. Whereas at the beginning they have the mean to make some politics, to fight, to explain, to be more aggressive, and to spend more efforts making sure that the people that got things, that they were late, or they were making problems, get attacked from the very beginning. Then four years after that they should not have meetings to explain that, yes, you can keep TIDK making boards because we are as good as TI Dallas. That is politics yes.”

This was according to the TI Nice manager one example of a naïve approach by TIDK which had a critical influence upon the story of TIDK. Another example of a critical mistake by TIDK was, according to the TI Nice manager, TIDKs behavior in the game surrounding the RF competence.

We saw in the chapter “The Story Of TIDK” how TIDK according to the RF manager in TIDK lost part of its position in TI to TI Nice in relation to validation tasks. According to the TIDK manager things stated crackling for his group, when TI Nice suddenly conducted a number of validation tests at a time where TIDK was understaffed, came up with a number of mistakes, and therefore claimed to management that TIDK was not delivering the goods in relation to validation. The outcome of this was that TI Nice came in charge of this and thereby took over part of the position earlier occupied by TIDK within TI. According to the TI Nice manager TIDK lost their position as experts within the RF field to TI Dallas because they acted naïve and they did not defend their position as experts. The TI Nice manager explained:

“...in the RF I remember, again I was telling them, that it was a problem in the way they were validating their layout of the RF. In the RF making a layout of the board is very complex, and you need a lot of expertise. And I took meetings with them, I was telling them, pay attention, I do not understand why you are not using simulation tools to do that. In my previous company I was using simulation tools, why you are not using that. They tell me, [NAME OF HIMSELF] that is not true, we are experts, we do not need simulation tools. Ok, I come back to [NAME OF TOP MANAGER IN TIDK], in my mind, that is a mistake. Guess what, two years after that, the group in TI Dallas came up. The guy was alone. He made a mistake, he made a meeting with TIDK, where he told the team that he and his team will do simulation and will do layout of the RF, and they would give guideline for layout of the RF to guys in TIDK. It was, for TIDK people, it was completely an earthquake because, again, they were the experts, and here is one guy, with no team, he was explaining that he would get his team ramping up, he would get a couple of guys and so on and so forth, and he was simply telling them, that he is going to take their job. And now the layout of the RF is going to be done by his team and they would have to follow his recommendations. And the next step was of course now this guy gets couple of engineers, he get the simple idea which I told them, you should use layout tool and simulation tool, and we end up about two years ago, where in Dallas, their simulation tool setup was up to speed, they use a board, they run the simulation, and they come up with 30 mistakes in the layout. They come in TIDK, they review, and the conclusion of TIDK is that, yes, the 30 they are not valid, some of them are second order, but yes, it makes sense. So what was the outcome of that, they could not have known in the management, and the conclusion of the management is what, TIDK is no more expert in the layout, TIDK need support from TI Dallas, because TI Dallas was able to find 30 mistakes. And now, what happened was that, now TIDK is shutting down, but, finally [NAME OF NEW TOP MANAGER IN TIDK] understood that, and finally there was a guy [NAME OF THAT PERSON] that has been assigned to understand the simulation capability, the simulation tool, and be the expert in TIDK in this area. So this is another example of naiveness that was killing TIDK.” (Manager TI Nice)

We should here remember, that a TI Dallas manager explained in an quote presented earlier , that in 2008 TI Dallas was the center for the RF competence within TI, while the competences of TIDK was being overlooked. This TI Nice manager used the term naïve to describe the behavior of TIDK, and we have now seen his arguments for this. Another manager from TI Nice, the one who had been involved in the acquisition of TIDK, did not see the behavior as being naïve, but

presented a more detailed view upon the behavior of TIDK within TI, and the dynamics influencing this behavior. Let us now turn to his view upon TIDK.

3.2 Another TI Nice manager view upon TIDK

According to this manager, with more 25 years of experience in TI, there were several dynamics causing TIDKs behavior to be as it were within TI, and the story of TIDK to unfold as it did. In the interview he gave a view into some of these dynamics, and to understand his arguments, we should begin with the issue of leadership. According to this TI Nice manager, TI is a courageous company when it deals with making tough decisions and decisions are made fast within TI which makes leadership important within TI. However seen from his view there had not been any leadership in TIDK, as he explained, quote:

"I think what is important to drive decisions, is leadership. It is not only pushing for making fast decisions, but it's also leadership. It's an observation, so it's, it's an observation, I'm not putting here a critique, and then there might be a lot of reasons. It's an observation, that we have not been able to post strong leadership responsibilities in TIDK at people level. Why, probably very very would deserve long print story, because I think there are a lots and lots of dimensions. But at the end of the day, we were not able. I think there might be a cultural aspect of it. That is that 10% of it, 20% of it, I don't know if you look all across companies located in your country, maybe you have found a similar issue, and maybe some companies have been more successful to establish leadership, leadership position in, in. And again in setup, the TI setup is this, through acquisition and so on. I'm not speaking about companies which are well established and are coming from your country. I'm speaking scenarios of acquisition like this one. I think there is a cultural dimension. There is a people dimension to. And other dimension is maybe we haven't been bad in, maybe, because I'm not sure, so might be ambiguous because I'm really, I'm not sure. We have not been smart in establishing this leadership. That's an observation, that the people in TIDK are, again well recognized and so on, so it is not, this is not a negative message I have, but if we look at the high level, we were, we have not been very successful at positioning a leadership position which is companywide. Companywide you know, acknowledge at the very high level at the TI Company." (Manager TI Nice)

The issue of leadership here does not relate to the visibility of TIDK within TI. According to this manager the top management in TIDK was well aware about what TIDK was doing, what their competences were, and so forth. The issue related more to the leadership of the management in TIDK, as he explained:

"I can tell you, I have spent my last 15 years always to explain what people were doing, why they were important and so on. Because TI is a company which is, you know, technically managed across business resources. You can imagine that I have 10 times or 20 times had to explain what was the mission that I am doing for Nice or for whatever site. So it is not a problem of visibility, TIDK has been visible. It's, it's a difference between being visible and being acknowledged. Because I can tell you TI, Texas Instruments, is not slipping in activities just for the sake of certain activities, its activities which are key to any, to the business. So TIDK has been key to the business, has been visible, has been acknowledged, this is not the issue. I'm mentioning the specific topic of having someone in TIDK as being a highly highly acknowledged from a leadership position in TIDK." (Manager TI Nice)

The lack of leadership in TIDK should therefore not be understood as there not being any top manager of TIDK who was the face of TIDK and were known within TI. It should rather be understood in the way that there was no person in TIDK who were recognized within TI for his leadership, as the following quote show:

"Kristian Hegner Reinau: Ok so there haven't been a face to put on top of TIDK who have sort of represented TIDK

Manager TI Nice: Yes, there have always been a face, [NAME OF TOP MANAGER IN TIDK] has been this face for a long time, but I would say that as a, that has shown, a very very strong leadership position within TI.

Kristian Hegner Reinau: Ok so that has not been existing

Manager TI Nice: That has not been existing, and again, this is not blaming anybody, this is an observation."

We should also note in relation to this aspect, that given the empirical level of this story the actions and characteristics of some key persons, for example top managers within TIDK, have had a relatively large influence upon the course of the story. The TI Nice manager also stated that some of the frictions between TIDK and TI Nice might be caused by people with "strong minds" who were difficult to handle in discussions:

"...What we found afterwards on both sides, and maybe we made a mistake there, in that we put in the beginning in the discussion some people which were I would say, not easy people to deal with. And you know this category of people always exists whatever the culture are, so this didn't help. So I think on both sides we make the mistake in some sense to put people who were too strongly minded, that would have been possibly better to put people more open and less strong minded, so I realize on both side we put people which were too much you know strongly minded, and it took me time to understand this, because I found, after awhile that some people that were causing issues at TIDK site, the was not TIDK this was not the culture, this was the people themselves, and possibly vice versa for some people in Nice you know. So we potentially made the mistake to put to many people that were, that was to much difficult to handle within the, in some discussions" (Manager TI Nice)

He was not the only interview respondent to underscore the importance of individual upon the story. The TI Nice manager who saw TIDK as naïve stated, quote:

"Kristian Hegner Reinau: ... Are there differences between managers from TIDK and then managers from other TI sites

Manager TI Nice: I, yes, but you know, I know only two managers from TIDK, three, I know [NAME OF TOP MANAGER AT TIDK], [NAME OF TOP MANAGER AT TIDK] and [NAME OF TOP MANAGER AT TIDK], and the three of them are very different behavior, so I think the difference is more due to the personality of the manager of the site, that are managing it" (Manager TI Nice)

We should note that the answer by the TI Nice manager refers only to top managers of TIDK. There were several persons in TIDK with manager positions, and he later stated in the interview that there were differences between DU managers from TIDK and TI Nice, and that TIDK DU manager were more concerned with their people than DU managers from TI Nice. A TI Nice engineer gave the following view upon the importance of individuals in the story:

"K: ... now we talked about engineers, if we look at managers, is it different to work with managers from TIDK and managers from TI Nice.

Engineer TI Nice: On this question I will not, let's say, associate any differences with culture or whatever, I would say it is really really tied to the personality of the person. And you can have some similarities or differences on each side, it is really tied to the leaders. I do not, I cannot let's say associate any culture impact on the way of doing, on this level at least." (Engineer TI Nice)

Let us now return to the view upon TIDK from the second TI Nice manager. So one issues characterizing TIDK, according to him was a lack of leadership. Another issue describing TIDK was a consensus behavior, he explained:

“Manager TI Nice: I noticed from the very beginning something which was, I think, but you know, I don’t want to be binary, because the culture is very complex, but in TIDK I observe from the very beginning that there is, and maybe this is the overall culture of this country, more an approach which is based on the consensus. So this have created some times I think, some misunderstandings. And again I don’t want to be binary in culture because you know, I think we need to differentiate the culture, and the people inside the culture, you know. Because people difficult to deal with you will find in every culture. But this culture of consensus as giving birth at the beginning to some misunderstandings.

Kristian Hegner Reinau: How

Manager TI Nice: As an example, you know at that time I, I had to take some decisions, and I found that I took some decisions based on the majority vote, and I found that these decisions were potentially raising some concern in TIDK. And I discuss with some managers then they told me, [NAME OF HIMSELF], yes, we are different culture, our culture is to discuss discuss discuss until a consensus is emerging. So I had to adapt myself to something that was new to me. So, and I think, to come back to your question, this has maybe created some issues that I didn’t find at the beginning, that possibly the strategy of taking decisions based on the majority vote was something that was hurting TIDK staff.”

The manager further explained that by hurting he meant that the majority voting made TIDK employees frustrated. So TIDK was consensus minded and lacked leadership in the account of this TI Nice manager. Another issue characterizing TIDK in this manager’s view related to the way of using the term commitment in TIDK

“I think TIDK was pretty fast, which is good, pretty fast to commit themselves. In terms of execution and so on. And I learn step by step, that this commitment has to be taken with care, so I think it is potentially a company cultural aspect, that when in TI when you take a commitment, you know you are taking a strong position. Whereas, and TIDK, I found this at the beginning, and I learn, that it was more an intent. More an intent that has to be solidified next. So I went to some potential misunderstandings there of TIDK committing, but in fact that has different meaning to the traditional one I had in the TI company, which is when you commit ok, that mean you are going to deliver on time bla bla bla bla [HE SAYS THIS]. So I had to adjust myself to this behavior, and we understood it, but from time to time, it has resulted in some kinds of confusion.” (Manager TI Nice)

Asked further to this TIDK way of interpreting commitment the TI Nice manager explained that the TIDK behavior had a positive side to it, which was openness compared to other sites. On the other hand it also carried with it a risk and TI managers in contact with TIDK had to be cautious and act to take into account this commitment culture, as he explains in the following quote:

“It should be understood that, I think there is a positive side of it. From, I think a cultural aspect is that I found TIDK always open, always open to take challenges, always open to willing at commit, then to say ok, I’m going to do it, I will do it, and so on. So it’s very positive, because it is very very good to have people open to take challenges. There are people that are coming to you and say, oh I’m not sure I can do it, I need to think about it, I will come back to you and bla bla bla, you, people that are too cautious. But I found, and again it is a cultural difference, it’s not a quality difference, it’s a cultural difference to deal with, I have found that this willingness to execute and so on, and then giving birth to yes, I will do it, it has to be taken cautiously. At, but again it’s, I’m just highlighting here a difference, not making, not telling you that this is bad, or good, just to tell you a difference that need to be adapted to. And then of course when I had understood this difference, it’s very easy, then you have just

to take some statements more cautiously, and ask more data, or put in place something to track in order you have some fines, that this commitment which might have the trait to be more promises, are better handled, so again it is not an issue, it's an tuning that is needed in order to, because this commitment culture of TIDK." (Manager TI Nice)

The point of TIDK being more open to commit than people from TI Nice, as seen from this TI Nice manager, also fits the view upon the issue given by a TI Dallas manager, who stated:

"...Maybe a little bit, so that TIDK folks are cautious to commit, they don't want to over commit. But when they do commit it's a hundred percent guarantee that it will be delivered by that date. The French, you will struggle to get a commit out of, of anything, I do, at least I did. And the Dallas folks, they would commit to anything, but would rarely deliver. So it's a little bit different. There I think there is a little bit difference here and there, yes. So sometimes they would over commit here in Dallas I think, and actually underperform." (Manager TI Dallas)

The TI Nice manager further elaborated upon the issue of openness in TIDK, quote:

"...this is the openness, openness of TIDK which I also acknowledge, but in this openness there is an risk dimension, which is to, you know, to go to fast. To fast, to commit, and then it can be after, you know, resulting in misunderstanding, in issues and bla bla bla bla bla. But again this is potentially a cultural difference, which have a positive side, which I found TIDK always very open, but that has need to be balanced, by the fact that yes there is a risk under it of this, there is something that need to be put in place to track and to monitor that this strong willingness is going to be able to be executed..." (Manager TI Nice)

And this risk proved its existence sometimes, as the manager explained:

"...I can tell you from time to time this difference has created some issues because some people in Nice were coming back to me, was telling [NAME OF HIMSELF], look TIDK they are saying they are going to do this, they are committing to it, but frankly speaking how are they going to do it. There I don't, and this is very good questions, because from a different culture here in Nice, and again it is not tell you that these people are better or bla bla bla, it's a difference. They were a little bit frustrated when they saw TIDK was taking challenges and committing to these challenges, whereas on their side they were observing that it was from time to time potentially a little bit too much optimistic you know. So again it is not a politic statement I'm making here, it's just observing some differences." (Manager TI Nice)

So we have now heard about how TIDK was lacking leadership, were consensus oriented, were open and had a different way to understand the term commitment compared to TI Nice according to this TI Nice manager. With this in place we can begin to understand why this manager did not see TIDK as naïve. Rather, as he explains in the following quite, TIDK was different compared to other TI sites, due to the differences discussed above. This was sometimes leading to what he terms naïve statements being produced by TIDK, which he then had to filter before they traveled further in the TI organization, as he explains:

"I don't think it's naïve. I can tell you, I have at the beginning, I have to learn this because it was something new compared to me and my experience in TI, but I don't think, I don't think it was naïve, I have always respected this, and I think this was, this was good. Now in fact, I had to take it into account, because if I had, within bracket, to rely on all the promises that was made to me, I can tell you, I would not be any more in TI. So I had to learn this, I had to learn this, but I think this, when you have learned it, you have some difficulties to deal with it. Because ok I always have people telling, coming to you, and say, oh look at these guys, they are too optimistic to optimistic. But that's the way they are doing and it's their culture. So I don't think, I think it was, I think it was the right attitude. I always have been happy to see how TIDK was open you know, but, but I have to take into account that that was risky, but I

wouldn't say naïve. I wouldn't say naïve. The naïve side of it I can tell you, as I always said it to some TIDK managers, and mainly to [NAME OF TOP MANGER IN TIDK], the naïve side, I can tell you, I have always protected TIDK against it. When I have seen some naïve statements, that could have created, you know, some big concerns to my management, not to myself because for me I was able to understand it and to put some judgment. When it was like you say naïve and could have come to issues because it could have been shown to my management, I have always filtered it. Because yes I agree with you, sometimes it is not good to show yourself a little bit too optimistic or to naïve, but I don't think it has been an issue. The part of it that could have created an issue has always been, you know, filtered." (Manager TI Nice)

The difference to the view by the first TI Nice manager is therefore, that in this account it is the outcome, i.e. the statements produced which was naïve, but these were not the result of a naïve behavior in TIDK, rather they were the outcome of a different behavior. And as the manager points out this different behavior also gave TIDK some positive characteristics, for example an openness to take new challenges etc.

We might ask ourselves, how should we then according to this view upon TIDK understand the actions taken, or not taken, by TIDK in relation to the political games surrounding the RF competence or production of boards described by the other manager, who argued that TIDK was being naïve, and that this was killing TIDK? In the view of this manager many different issues have been working together in creating the behavior of TIDK through time, as he explains in the following quote:

"I think the rationales are multi reasons, multi reasons, I'm sure about it. We use the word consensus, we use the word, that I have found in TIDK more more more more than in some other locations. The idea of having the recognition of a group versus the recognition of individuals is in the DNA of the people within TIDK. And I think, I respect it, and it's very, it's very good aspect. But when you are overall, let me summaries you on this, it's too easy to summarize, but if you are a little bit more shy. If you are more consensus minded. If you are more, you know, team recognition versus individual recognition. Then within a company like TI, with, you know, this is not within brackets, this is creating some limitations. Having this said, people are intelligent within TI, when they know and understand the culture, then of course they are adapting. That is of course nobody is expecting, was expecting, TIDK guy to show up in a meeting room loudly and making his points, you know, and let me say in France, putting the hand on the table and saying guys, this is like this, and I will not change my mind. Of course nobody was expecting this. So people were making the effort of listening, and so on. So people are adapting of course, but then, but the blind, ok these differences like you mention, have dimension which is limiting by construction the leadership, leadership aspect. Now having this said in TI, all is not leadership, other is also execution, so the other angle is execution. And the limitation execution wise, that I try to highlight to you, is this commitment culture. That need to be taken with, because in TI, you know, the commitment to execution this is, within brackets, the bible of the behavior. People can smooth the personality, the culture, but, this culture of commitment is very very strong. So I think this is more the aspect which is, which was very important really to monitor carefully, because when you take a commitment in front of a TI manager, you better make it. And this is the area where it has to be looked very very carefully, and a little bit filtered, in order to avoid misunderstanding. And again this is misunderstanding, because, this is not quality wise, this is, this is the way of understanding the commitment, which is different in TIDK than elsewhere, you know, and again we have to manage with it. But this adaptation was a bit, was the one that was the less easy one. Because the other dimension, you know, it is easy when you see people in a room that are shy. It's easy, it's very easy to diagnose that they are shy. But when you have people in a room who are committing themselves you might believe in it very strongly, and then you may, it takes more time to understand that this have a different meaning in their mouth than your meaning, which again is coming from your company culture meaning, which is not, which is not being about dictionary meaning." (Manager TI Nice)

In this quote the managers summarize some of the reasons for engineers and managers behaving as they do within TI. The quote therefore draws on some of the previous discussions, and adds some points worth looking at in more detail. As the manager states in the beginning of the quote, there are several reasons for the actions of TIDK being as they were. This fits with the findings in the chapter "The Story of TIDK" where the dynamics influencing the story of TIDK was described, and these dynamics ranged from changes in technology over changes in market, in the management practices, in the organization and in work of the engineers to cultural issues. There is therefore not a single factor that can explain the behavior of TIDK. Having said that, let us focus more on the cultural side.

The first issue the manager brings up in the quote is the issue of consensus. The second issue is the issue of having the recognition of a group versus the recognition of individuals. And the third issue is the shyness, according to this manager people from TIDK were shy in their attitude than people from other TI sites. This also fits to the point in the discussion in the chapter "The Story of TIDK", where it was argued, that some engineers and managers from TIDK found it difficult to make their voice heard within TI. Combining these three issues, i.e. shyness, a focus upon consensus and a focus upon the recognition of the group vs. the recognition of individuals, then the outcome is, according to the manager, a lack of leadership. As he puts it, quote "nobody is expecting, was expecting, TIDK guy to show up in a meeting room loudly and making his points". The final part of the quote relates, to the commitment culture, that TIDK was committing without having the basis for doing so in the TI Nice understanding of the word, which caused misunderstandings within TI.

We can now go back to the first manager from TI Nice who argued that TIDK was naïve. His point was that TIDK did not take actions to fight for their tasks at the necessary time, and he saw this as a naïve approach. Having now presented and discussed the points made by the other TI Nice manager, we can say, that a picture emerges, which is the following. The actions taken by TIDK can, seen from a TI Nice perspective, seem naïve. Naïve because TIDK did not fight and behave aggressively in the political game. However, if we try to understand, seen from TI Nice, the reasons for this behavior of TIDK, as the second manager did, then we obtain a more nuanced understanding of the behavior, which is that TIDK behaved as it did, because engineers and managers in TIDK were shy, had a focus upon consensus, a focus upon the recognition of the group vs. the recognition of individuals, an openness and another way of interpreting commitment than people from TI Nice. And together these qualities resulted in, compared to TI Nice, a lack of leadership and an openness and commitment culture that lead to misunderstandings. This view upon TIDK supports the finding in the chapter "The Story Of TIDK". Here it was discussed that engineers and managers from TIDK were proud of their work, that they produced a technically high level product, and then believed that this high technical level would speak for itself within the TI organization and therefore not make a lot of effort to make their voices and opinions heard within TI. I.e. they did not 'shout' in the organization to get influence, as the manager puts it in the quote above. However, as both this manager and some managers from TIDK also stated, such a quiet approach does not work well within TI, with TI's company culture, as the TI Nice manager who did not see TIDK as being naïve explains in the following quote:

"Manager TI Nice: I think, you know there is a shy aspect that of course is not helping when you have to, and again this is, this might be specific to TI, I cannot, and again, this is the only company I know. But there is an overall observation, that this community of people [TIDK] is more in the shy category, and it's an observation, I'm not putting it again as an issue. I think this aspect of course is not helping in a company like TI, and again this is the only company I know, when you have to make your points, when you have to fight to make decisions. And that's the observation, that means, and again this is an observation which is known, so it's a matter of compensation, when we had to do it, to compensate, and to bridge the messages by

some individuals including myself, in order to bridge the message to the management. Ok, so is that specific to TIDK, is that specific to the culture, I don't know. Is that specific to TI, uh, you know, you have to have people opening their mouth loudly, I don't know, maybe in Denmark its different, and people do not have to open their mouth loudly to gain, to gain interceding from management, I have no clue. Of course I have, I have, you know, I have worked with, for long years, with a company like [NAME OF NORDIC HANDSET PRODUCER], and I see also different, maybe different culture, I don't know. But in a company like TI, yes we need to open your mouth pretty loudly, and yes maybe you can tell me is that a cultural aspect or not. But, yes my observation is, that in TIDK there was some difficulties to this.

Kristian Hegner Reinau: But, were they more shy than people in TI Nice for example

Manager TI Nice: Oh, yes yes yes, or in Dallas, or wherever."

Asked to whether this shyness had any consequences the TI Nice manager answered:

"Kristian Hegner Reinau: ...you say you compensate for it, for example when they are shy and don't get of the ramp up here, but does it influence the work within TI this shyness, even though it is compensated for

Manager TI Nice: So the way it influences that of course it is, it is burning some of your time, not because you don't trust people, I used to say that I trust everybody, but I'm not confident in anyone. Trust because, that's human life you know, I don't see any reason why I would not trust anybody. Now being confident is another aspect, being confident mean, ok, you, and then it means from time to time, I have to, you know, to within brackets, as you say to compensate and making sure that the message is bridged, and if the message form TIDK needs to be a little bit better formatted or it need to be worded with stronger statements, of course I had to show up, and, so. Just to, you are asking me, what is the implication, implication is ok when I had to do it, I had to burn some of my time to do it, so ok, so it is a matter now of agency, so I would not label this as a concern of inefficiency, but you ask me the implication, the implication is that I had ok, from time to time, to make sure that the message was well formatted and was clear enough and so on. Frankly speaking I think this is result which is Ti culture related, because on my side, I have partly, partly from time to time the same problem with my management. So I'm sure that part of it is coming from a TI culture aspect. Having this said, the TIDK culture is making it more critical, if you understand what I want to say there." (Manager TI Nice)

Having built this external view upon TIDK and its behavior as it were seen from the two TI Nice managers, we can now start to understand some of the dynamics causing TIDK to lose its status as the center of RF competence through time. One of the reasons is, according to these interviews, the way in which TIDK behaved within political games within TI. We might call the behavior naïve or we may see it as an outcome of several characteristics, as discussed above, but the outcome at the end of the day, was according to both managers a behavior that were limiting within TI, where people are expected to shout and make their voices heard to get influence.

We might ask then, did TIDK change in the views of these two TI Nice managers? Looking at the competences found within TIDK, they did not change significantly according to the TI Nice manager who saw TIDK as naïve. TIDK kept it's competences through time and tried to build new ones, but were, however, not paying enough attention to the political game within TI surrounding these competences.

"I think, I cannot se change over the time, no, I think they keep this expertise, they try to enlarge their expertise in some areas, and some was ok, some was less ok, but basically I would not say that they lose something. They just, as I mention previously, don't pay enough attention to the politics, and when you are recognized as being experts in an area, you need

to continue to prove it, to show, to make noise around it, to make sure that nobody is going to attack you there.” (Manager TI Nice)

The way TIDK tried to build new competences was amongst other things through hidden projects according to this manager:

“I think, that in TIDK they were still able to think about future and through solution delivery, or some hidden R&D activity, they were still able to do some kind of research. Which was very difficult in Nice, because we have better visibility on what the people were doing. Sometimes we have less visibility in TIDK, and then we discover that they were working on something else...

... I have an idea of four layer PCB for the [NAME OF PROJECT], that was started under the carpet. And was decided to prove that we were able to have a low cost PCB for [NAME OF PROJECT], which I think they realized it was possible, but they started under the carpet, I would say. There was another activity that was started with the integration of some passive components on program management chip. They were doing some activity in the, it was kind of hidden. Recently, they started to make form factor boards, for a phone.” (Manager TI Nice)

According to him, there was no time for such activities in TI Nice, quote:

“We were, since the last three years, we were struggling to get in engineers, so not a single engineer was not working on something that was planned. So there was always a debate, we were, the DU managers were willing to have about 10 percent people doing something else so that they could work on the future, and we have no more any time to work on the future, we were only 100 percent staffed on the current activity.” (Manager TI Nice)

We should note that this view is exactly the opposite as the view from TIDK, were an engineer explained in an interview, that he had been in both TI Dallas and TI Nice to work, and the pressure on the work there were less, and that people therefore there had more time for politics in TI Nice and TI Dallas, see the chapter “The Story of TIDK”. A manager from TI Dallas argued that, quote:

“My feeling was that engineers in Dallas was under more pressure [THEN TIDK ENGINEERS] because, just because we were seeing more the customer need and also involved in more direct meetings with TI senior management because they are here in Dallas. Whereas the Aalborg folks would sometimes be on the phone. But I think there was a difference in the pressure level, it was higher in Dallas. Also if you look at the technical issues we had with our projects, most of the problems were due to problems with the transiver, which was designed in Dallas. So that also lead to most of the pressure being on the Dallas people to resolve, you know, feel more pressure on the project” (Manager TI Dallas)

So TIDK people argued that the pressure on the engineer was highest in Aalborg, TI Nice people argued that the pressure on the engineers was highest in TI Nice and TI Dallas argued that the pressure on the engineers were highest in TI Dallas. To illuminate whether the pressure on the engineers were different at the different sites, I posed questions to respondents from all three sites to illuminate how the engineers would build new competences, whether they had time to look into issues not described in their assignment list and participate in courses etc., to probe how much freedom they had in their work, and thereby illuminate the pressure on the work. However, respondents from all three sites gave similar answers stating mainly that they only had time to pursue the tasks given from management etc. So from these questions it was not possible to draw any conclusion as to whether there were different amounts of pressure upon the engineers in the three sites.

Let us return to the political game. The quote by the French manager showed, that the political game between the TIDK and TI Nice were about gaining tasks and building new competences, and apparently this was done amongst others by starting hidden projects at TIDK. This approach of utilizing hidden projects in TIDK was not in line with the TI Nice managers wishes, quote:

“So in term of program director, I’m not aligned with the approach because at the end of the day my budget of the program is bigger, and the number of people working on my program was higher than the reality, because they need to have some people working on something else, and they need to allocate it to the program. So I was not happy with this approach because I was paying for something I was not willing to do. Then there are some activities for which I was, afterwards I would say ok, so it makes sense, it is good. And there were some of them for which I was not in any mode, because I just thought it was not, it was useless.”
(Manager Ti Nice)

One could ask the following: Was it not a counter example of naiveness from TIDK, that TIDK was able to run hidden projects? The TI Nice managers view upon this was the following:

“You can see both ways. I know you say this is a counter example of a naïve approach, because they are capable of doing things in the background, or you can say yes, this is naïve because they are not used to the politics and they are not able to come with a project and say to the top level management we believe we have to do it, because this and this and we are going to ask you to put three engineers for six month to try it. So I think it is maybe not, I would not classify that in naïve, I would classify that in maybe lack of capability to be visible by the top level management” (Manager TI Nice)

So in this the manager also hits upon the issue high-lighted by the other TI Nice manager, the lacking leadership in TIDK, in his point about TIDK being unable to sell their project ideas to top management in TI and get green light to pursue them, and therefore instead starting them secretly.

According to the other TI Nice manager, who did not see the behavior of TIDK as naïve, the basic culture or behavior of TIDK did not change through time. Rather, it got a bit closer to the behavior of TI while people from other TI sites adapted to the behavior of TIDK.

“Kristian Hegner Reinau: Ok, has this, this TIDK culture or way of doing things, has that changed through time, or has it been the same

Manager TI Nice: I think it has, the basics have not changed, the basics have not changed and maybe because ok, people have accommodated to it, and they have then been able and that have been ok. That may be the big rationale, and, ok I think they have evolved a little bit because you know TIDK have learned TI culture and so on, but the basics have not changed drastically. Because I don’t think the basics have to be changed, this part of the culture, of the quality, of the openness, that should be a disaster to have everybody adapting to one unified model. Once you know, once you know these details, then it is becoming easier, but of course, business as usual, it takes time to understand these details, because it takes time to understand the people, it takes time to understand within the peoples those which are special case because in each group of individuals there are always, you know...

...so the basics have not changed, they have tuned something, because TIDK has realized step by step that ok, this wording of commitment have to be taken more seriously than the default application, so yes it has evolved, but it has not been, it has not, basics are still there...”

So the culture of TIDK remained relatively constant through time according to this manager, and apparently the work areas did not change a lot according to the other manager, even though TIDK tried to build some new areas. Why were TIDK able to try and build some new differences

hidden in projects? To understand this we need to take a closer look at the work split between TIDK and TI Nice in relation to the RF area and the nature of the political game between the two sites.

3.3 The political game between TIDK and TI Nice

To understand the political game between TIDK and TI Nice we should start by looking at the work split between the two sites. It is not possible to present the precise work split here, due to the complexity of this, so let us take a look at an overview of what was done at the two sites in the latter years of the TIDK story, where overlaps in the RF work had emerged, refer to the quote above where a TI Nice manager explains that these overlaps emerged through time as a result of TIs strategy to produce its own RF components. A TI Nice engineers explains the work split between TIDK and TI Nice in the following way:

“...there were some validation boards in Denmark and some in Nice, there was this to. And at some points, sometimes, there were grey areas let say, between responsibilities between both sites. Basically what was planned to be done at, in term of work split, was that in Nice it was more a matter of doing some block, RF block validation, cause the IC team was located in Nice, so these guys was doing RF validation, but as well some RF system integration, meaning the overall RF pass...

... this is the charter of Nice. And then the charter of Denmark was to take the application, drop it on a PCB within say a reference design, plus form factor, plus telephone form factor, sorry, and then run the entire validation, meaning within this configuration, implementation, in term of telephone form factor, and make sure all the performance is within spec, were fulfilled. Considering as well other specs such as optimized costs, EBOM, PCM spec and soon. Which were not, let us say, one of the main drivers in Nice. In Nice it was more oriented let's say pure validation, no couple tight to, let's say, a final project. This was, let's say, the main changes between both sites.” (Engineer TI Nice)

A TI Nice manager gave a description explaining some of the overlaps also, quote:

“So in term of the RF, so, there is a group in Nice that was in charge of the RF definition and validation, in TIDK there are also capability I would say, to do definition and of course validation, so there were some overlaps in term of the, owning the system definition, doing the validation. In the last two years I spend a lot of energy to synchronize the two teams and to get similar looking things in the report, making sure they are not rushing to duplicate activity and stuff like that. And this was something that management was not able, or did not try, was not willing to address, because, many reasons, they were not willing to dig into this overlap. Emotional things, because when you address overlap in the company, this mean at the end of the day, you are expecting to take some decision, and they on one side were doing this, on the other side we are doing that, making sure that there are no duplication, and this is something that the management didn't have the grade, let say” (Manager TI Nice)

The lacking intervention of the higher management in relation to the overlaps between TIDK and TI Nice was also seen by a TI Dallas manager:

“I just think it's a lack of strong management. I think when you have three sites, you need to, you need someone in one site who is, you know, enforcing how the sites work with each other. And I think that was something which was lacking in TI. With that many sites strong oversight of how the sites worked with each other was lacking” (Manager TI Dallas)

The struggle between TI Nice and TIDK to obtain tasks and lacking intervention by the higher management was also seen by an engineer from TI Nice:

"Engineer TI Nice: ...For example I worked on a project last summer, but only during three months, then the project was cancelled. At that time it's true that, one team, there were some people in Denmark who hadn't any job to do, any work to do, they wanted to take part of my task, of our team task here. And we had a lot of lot of conf calls, and tried to design, to split the work between the teams, and so on, but the point at that time when we started to define the execution and we could not find any solution, then we report the issue, I report the issue at my manager, who also reported to higher management, and so on. Kind of escalating the stuff. And at the end it was a bit amusing, because at the end, at least for this particular project, at the end, no decision, even if this issue, this conflict was escalated, escalating, was escalated at the different levels of management, it was not possible to find a solution, and the project have been cancelled, but we couldn't find an issue, we couldn't find, let's say, an agreement

Kristian Hegner Reinau: Ok, why not.

Engineer Ti Nice: Because actually, from our site, here, it was impossible to split any task, because, ok, to be consistent, let's say the tasks were really interdependent, and it was not easy, it was not so easy to let's say, split the task, interdependent task, because of the task...."

The view upon lacking management intervention to minimize overlaps between different sites, expressed in the quotes above, also fits with the view from TIDK. A TIDK manager explained in an interview that at a time the TI top manager in charge was a technician who did not care much about minimizing overlap, because if things were done twice, then at least they were probably done right. This further caused the political game to intensify in the last years of the TIDK story when this manager was replaced by another manager more focused on efficiency and hence on minimize overlaps.

It seems plausible that the lacking high level management intervention regarding the work split between sites, and overlaps between sites, has left room for political games in which TIDK, TI Nice and TI Dallas have tried to gain tasks from each other. Let us therefore look at the political games between TI Nice and TIDK and the nature of these. A manager from TI Dallas explained that seen from his position there was a fight over tasks between TIDK and TI Nice:

"Manager TI Dallas: ... I'd also, one other thing I notice between the two sites there were some bits of turf war in terms of where there were overlaps between TI Nice and TI Denmark. There wasn't a lot of sharing of work tasks because people in TI Nice felt they needed to, you know, keep the tasks in nice and not share them that much with Denmark. So there was sometimes some friction there.

Kristian Hegner Reinau: Ok, can you elaborate a bit on that, can you give some examples, maybe on what areas the friction was about or something like that.

Manager TI Dallas: Well there were some tasks on the project which were done twice. For example you know some small RF tasks might have been done twice because the folks in Nice did not want to take the engineering work from Aalborg and just implement it in their system, they wanted to sort of reinvent it. It have seen sometimes that work, you know this resulted in some tasks being done twice, which was kind of waste of resources at the TI level."

And from his point of view the presence of these games had been rather constant through time:

"They were quite constant over time, they never really came up to the head, I think in the last couple of months before they shut down the site, they were trying to improve the corporation between the two sites, and there was a movement made to make TI Nice more managed directly to the tasks of the TI Denmark people and to try and fix it that way. That didn't get to pay itself out, because the site was shut down, so." (Manager TI Dallas)

When asked about why these games existed his take on this was that it was due to French culture, quote:

“I think it is a cultural thing in France, I have seen it in other situations, where they are protective of their work tasks, just from a job security standpoint of view, and sometimes reluctant to share their work tasks in case it makes them no relevant, and they lose their jobs”
(Manager TI Dallas)

When asked about how whether he saw TIDK as being open or naïve in political games with TI Nice he elaborated upon this:

“Manager TI Dallas: I think maybe, you know, that is something that could have occurred with TI in Nice, in terms of, you know, TI Nice might play some of their card closer to the chest, I think, you know, with the, with Dallas there was quite a clear worksplit in terms of what they were doing and what we were doing. And we in Dallas I think was very open as well in what we were doing. So I don’t think their openness lead to any disadvantages for them, but it might have lead to disadvantages in their relationship with the folks in TI in France.

Kristian Hegner Reinau: Ok, does that mean that folks in France are more political in their acting or

Manager TI Dallas: Yes, yes

Kristian Hegner Reinau: Is that something you have experienced

Manager TI Dallas: Yes, you know, I mentioned earlier, sometimes their element of protecting their job or protecting some of the information they have, so I think that might have been, you know, in play with some of their interactions with Denmark as well.”

This add a dimension to the previous discussions’ about TIDK being naïve, open etc., and this dimension is that maybe some of the reason why TIDK was seen as been open and naive from TI Nice was because TI Nice was rather protective of their work tasks, and hence ‘closed’, compared to TIDK and TI Dallas. Let us therefore look closer upon the issue of TI Nice being protective of their work tasks and hence more closed than TIDK. Observations made by the other TI Dallas manager also indicate that TI Nice engineers were more protective of their work tasks than TI Dallas and TIDK engineers:

“Manager TI Dallas: I remember I was there [TI NICE] in my first trip, which was the end of 2005. I was just an application engineer, I was completely unknown. I had no reputation yet of actually doing stuff or executing stuff. In TI it works very much like that, you have to have a build reputation first, for having solved a big task. Done something. So I was completely unknown, I might as well have been a new college grad for all they knew, they didn’t care. But then I came to France, and I have meet with at least two engineers there that have been there for years and years, and they ask me, are you here to take my job. It was a very strange question to get. And I said no I’m not, I’m here to help us all out so we can solve this problem.

Kristian Hegner Reinau: Ok

Manager TI Dallas: And that question was never given to me in Denmark, they were always very much different saying, what do we need to do to solve this problem.

Kristian Hegner Reinau: Ok, does that mean that they are more open in Denmark compared to in France.

Manager TI Dallas: I found it definitely yes, but I also again had less of a language barrier.”

An engineer from TI Nice also explained that TI Nice engineers were more protective of their information than TIDK engineers:

“Yes so basically about sharing information, I’d like to say that it was really really easy from TIDK. Each time I ask something for sharing information, tools, whatever, I got a really really good and fast, really fast and excellent support from them. No issue at all to share information. It was even, let’s say the reverse, they were really really pleased to show what they did and how and so. So it was really really, from this angle, really really a pleasure to work with them. Let’s say, I have, from my point of view, I have more difficulties to get information from some members of my team, French members of my team, I have more difficulties to get information from my, some of my team than with TIDK” (Engineer TI Nice)

Given that TI Nice apparently were more protective of their work areas than TIDK and more closed regarding sharing of information, it is necessary to pose the question: Did some people TI Nice keep their information to themselves to get overhand in political games, and hence in games surrounding the work split and assignments of different tasks? The view of a TI Nice engineer indicates that this was the case:

“Kristian Hegner Reinau: I was wondering when there is these discussions about who should do what, does that, are there also sometimes when people ask, then you don’t tell the whole thing because it is better to have some information for yourself.

Engineer TI Nice: Ha ha ha ha [HE LAUGHS], I’m not like that, no, I don’t like to play these games. Because from my position I’m really clear about that, I’m a TI employee, and I’m paid by TI, so all the information that I have is not my information, but it is TI information.

Kristian Hegner Reinau: Ok, do you think that there are people who are playing that game

Engineer TI Nice: Yes, yes, and as I say, I can see it, I can see it more, let’s say, from my French colleagues, I have numerous examples here, but I haven’t seen it in Denmark. I really really, from the experience that I had with TI Denmark, at least they played cards on the table, so they show everything, they don’t keep it for themselves.”

Asked to whether he saw any consequences of this behavior he answered the following:

Engineer TI Nice: Yes, I, because, I know that from, I believe that from Denmark point of view it is difficult for them to work with us. Because first we are not so well organized, we are changing, so they can say we are changing regularly, so it’s really a bit more difficult for them to follow us. And most of the, and also we are sometimes, so, I believe not me, but I have noticed that my colleagues, some of my colleagues do that, we are reluctant sometimes to share information, to get as I said some advantages. So I believe that for them it is not so easy to work with us. For example, I can give you like for example an example.

Kristian Hegner Reinau: Yes please

Engineer TI Nice: Probably you are aware that right now we are lay off, we are in a lay off process. TIDK will be closed, you know, and just before your call, I was discussing with colleagues from Denmark. They are here during a couple of days, I believe in fact all week, here to do the transfer of knowledge. Because as TIDK will close and this guy is here and is ready to share everything he have, and no issue with that, you know. And the point is, TI Denmark, let’s say TI will close his office, but he has no issue, he is here and he is happy to be here, and he is still even pleased to share the information, but he won’t have any work in two weeks, at the end of this month. But he is here. And if you ask to do that here, if let’s say you ask French people who will be laid off at the end of this month, if you ask them to go in Denmark to do some knowledge transfer, I’m pretty sure that most of the people will answer that they won’t come. So from my point of view they are, Danish persons are, they are really really professional. Until the end.”

What do these views from TI Dallas and TI Nice upon TI Nice tell us? Apparently, we can now add a perspective to the previous discussion of TIDK behavior as seen from the TI Nice. In the previous it was argued that TIDK was seen as being open etc. by the two TI Nice managers. The views upon the culture in TI Nice presented above do however also indicate, that TI Nice was relatively 'closed' and 'protective' compared to TIDK.

Having now underlined that interviews conducted in TI Nice and TI Dallas, points to a situation where TIDK has been relatively open etc. and TI Nice being relatively closed and protective of their work, we should now take a look at the arguments used in the political games. According to the view of a TI Dallas manager the political game between TIDK and TI Nice, which he referred to fireball throwing, was apparently to a certain extent played out between individuals in the organization, as the following quote show:

"Kristian Hegner Reinau: ... I was wondering these political games within TI, or well I don't know what is a good word for them, whether, when you said they were throwing fireballs at each other, and there is discussions about who should do what. I mean maybe one could call them management discussions or political games or something like that. I don't, what would you call it

Manager TI Dallas: I'm calling them fireballs for a lack of better words. I was told at one point in time that we, and this was the DRP team, we don't like person A B and C from France. So that is somehow political, because that was a immediate manager of mine, he came and said, we don't like this person. So we can either ignore him, or just, yes, and I don't know if it would have been different if it was a local manager, or if it was because he was from France, I'm not sure. But he was from France the guy we were ignoring."

This fits the observation by a TI Nice manager, presented earlier, that maybe some of the frictions between different sites was due to persons with 'strong personalities' occupying certain organization positions in TI. The TI Dallas manager explained that it was mainly technical issues that were causing the political games to emerge, but after the emergence they sometimes changed into another type of issues, where some persons or sites wouldn't let the issue go away, and kept nagging about it:

"Its, the stuff that I saw, it was something that may have started as a technical issue. But then one team had decided to clear that a non issue, but the other team kept nagging about it. So it was a technical issue, but it was more like, we should just agree on closing it and then move on with our lives, right. But then another team kept grinding on it, right, so then you would start grinding on this. And then say the DRP would then find something else and start grinding the Nice team about that. And then you had double sided grinding going on for no apparent reason. As I can really find, yes, so, it is a technical issue but it's more like we would not stop drilling into it. Just because we were kind of, yes not agreeing. Not happy with each other." (TI Dallas Manager)

This also fits with both the observations about personal issues maybe being part of the political game and also the observation that the presence of people with strong personalities had maybe caused some of the frictions between the sites. The TI Dallas manager further explained about the arguments used:

"It's a long time ago that we had the bad ones [FIREBALL THROWINGS], but the best is really just a lack of letting an issue go and agreeing on closure and then moving on. So it more at every opportunity a, at some kind of program review, a manager would then bring up an issue to. Say you have a review of a program, and you have program manager and you have middle level managers and you also have a VP [SHORT FOR VICE PRESIDENT] or two in the room. And then all of a sudden as you are going along talking about issues a senior manager then brings up his issue, whatever it might be. He won't let go in front of the VPs, and starts

nagging at it, and grinding at it. And then the two VPs in the room, then they want answers, and then the whole thing just keep rolling back and forth. And that's how I saw this." (Manager TI Dallas)

The other TI Dallas manager explained that often people from TIDK or TI Dallas would agree to close an issue rather quickly if there was an technical argument for a solution, whereas people from TI Nice would be more reluctant to do so, as the following two quotes show.

"Usually, I mean on some of the issues the argument would be from management that a task is duplicated because there is some small difference or some extra constraint, technical constraint, that exist in Nice or in Aalborg, or another site, which means that they have to redo the work or do it in a different way. Usually technical arguments are used for, you know, in cases like that the manager would make a technical argument to why some things should be duplicated or why something should be done here or there" (Manager TI Dallas)

"And I think, I know between Dallas and Aalborg we were always very fast to agree to resolve a conflict, if there were a technical argument as to why it should be resolved one way or the other. Sometimes in Nice, even with, you know, technical justification, they would still ask, you know, to check a little bit more in Nice before they make a final decision, so, I would say in that case it was, Nice would sometimes act a little bit different in terms of not agreeing immediately but wanting to go back and check a bit more before they made an agreement. In Aalborg and Dallas we'd always make, resolve issues very quickly with clear technical justifications" (Manager TI Dallas)

This also fit the previous discussion about TI Nice being more protective of their work. We saw in the chapter "The Story of TIDK" that it was mainly managers who were involved in the political games, and this was also observed by a TI Dallas manager:

"So the engineers, no they are not [INVOLVED IN POLITICAL GAMES], no. No it's not them, they are not doing it. So the engineers both in Dallas and in France and also in Denmark, if they are told to go and work together, they do it, and they do it without question, and their relationship, I think instantaneously is actually quite good. If say I sent a junior engineer from here to Nice to work with a junior engineer there, they would work great together, they would have a great three or four days and they would solve the problem. So I would say it is management and, so middle management and higher." (Manager TI Dallas)

A TI Nice engineer also explained that the political game between sites was something that was ongoing amongst managers, and at an engineering level engineers from all sites had good relations to each other. One TI Nice engineer explained, for example, that he saw the engineers he knew from TIDK as more than just colleges, he saw them as friends.

We can now start to form an overview of some of the drivers behind the political games between the sites in TI. These were apparently work tasks or the work split between sites, personal issues between individuals at different organizational positions, and different cultures. In relation to the issue of work tasks being the driver behind the political games it is worth noting that a TI Nice manager stated, in line with what managers from TIDK told in interviews, that DU managers always wanted to work on the newest technology and have the task that were most interesting seen from an engineering standpoint, as the following quote show:.

"Kristian Hegner Reinau: Ok, how, I could imagine that some would say, well, we should do that in France, and other will say, we should do that in Denmark, or we should do this in Dallas, because we want to do this, is it a political game, or is it just

Manager TI Nice: For sure there is politic, because there is always strong engineer behavior in the DU team, basically they want to be on the newest technology, they want to bring added

value, they want to be there, to maintain a growth, so this is, this is clear human approach of the DU manager, that wants for a team growth, and success, and he want, which is perfectly understandable, acceptable, and this is a good motivation I would say. So in that sense, as there was no management decision, and the management was letting the team doing their own, what is was doing is, of course, we are European, and I can tell you that, we, as Europeans, we have to be cautious of making sure that we keep added value in Europe, and then I was in the middle of the battle between Nice, and, battle is a bit to strong word, but negotiation discussion between Nice and Aalborg. And I was willing to, I was in relationship with the whole R&D, DU managers, site manager and, in TIDK and TI Nice, and I had to make sure that they understand what I was willing to do. They trust me, because basically I am in Nice, so they could think that what I was willing to do is willing to help Nice to keep everything, so I need to establish a trust between those guys and making sure that my motivation is program and program success, and as well I need to make sure that I have a kind of roadmap that makes sense, I cannot be only short minded, short term program, impacting also new activity. So I managed to get that trust, and then managed to reach a kind of agreement between the team, doing a lot of face to face, conf calls, I travel a lot in TIDK and so forth.” (Manager TI Nice)

The manager also explained how he was trying to avoid overlaps:

“Manager TI Nice: So, I have program responsibility, so in term of organization, I can only feed back to the management, that there is something wrong, which I did, but as the management was not willing to address the overall appearance, so in term of the program my approach is very simple and pragmatic. I call the DU manager and the program manager, and I say, this is what we have to do, let me know what you are planning to do, and then when I receive the different input, and I see the overlap, I start meetings and alignment processes, with the different people, willing to make sure that we understand how many people are doing what, when, what are the dependencies, and so on and so forth,

Kristian Hegner Reinau: Ok, so it is sort of technical arguments or,

Manager TI Nice: Not only technical, just pragmatic, you need to know how many people, you need to be aware of the budgets that you are, as program director you pay attendance to the finance, and then you challenge the DU to say what are you doing, how many people are you using, what equipment are you using, what software are you using, so you get all this info from the different du managers and then you come back, and you challenge, and if there is overlap you say, guys, sorry, but I get the impression that there are two teams doing the same thing here, so you try to address that and making sure that in the end you are going to the detail of the deliverable. And you say ok, if there are real duplication, then they come at the end of the day and they say, I will deliver this at that time, you challenge them, and you make sure that either one of the DU managers drop the deliverable, and say ok, I will not do that, is it going to be done by the team a or the team b, so you go into the detail of their deliverables, their plans, so it is not only technical.”

In the following this TI Nice manager tells about an incident where TIDK were trying to get room to use resources from his program on other things, but he discovered it:

“So in the simulation area you have to produce boards, and you need to tell that your boards are always working. And you need to say that you have run a couple of tests making sure that what you deliver are functional, and you have run your test to say it is functional. When you do that, you are overlapping some hole, a team in Nice that is in charge of the validation of the system. What we are doing in Nice, we are taking, we are doing chipsets, and here we are doing two or three components. We are taking the two or three components, we are putting them on the board, and we are making sure that the component can talk together, and there is no mistake. And guy from the software that will want to address the chip and making some function of the chip, what we call physical layer programming, it will work, what we want to avoid, so, well, I will rewind and step back. So what we are doing are integrated circuits. So

when you are doing an integrated circuit, you are testing and validating your circuit, your chip, in a standalone mode. That is everything that you can validate with your chip and only your chip. You are doing that. After that you are putting other components or other chips around this chip, so now you start to do what we call system validation, and this is not only your chip is stand alone by itself working, but putting components around it. You are able to validate more the chip, for example if you put a display, and you want to send an image, you are able to see the image on a display, and you are able to say yes, I am able to transfer an image from the memory to the display, and therefore you are validating much more than if you are just validating the chip where you say, it seems that I can refer from resistor input to resistor output, which is one thing. Now you can also validate from the memory to the display. Are everything going well, you are not missing a line, you are not missing pixels whatever, so this is system validation. And when you are able to do that, after that the guy that are in charge of starting the physical layer, which are they are programming all the chip, they are programming function for all the chip to be programmed and used, they are not going to face physical hardware issue but they are going to face software issue. That is the way we are working. So the guys in Nice were having system validation, and the guy in TIDK need to do boards, and he needs to give the board to the software team, and they need to say, when I come to give you the board, the board is working, and if you have an issue, it is because it is your software that is bad. So there is an overlap between the system validation in Nice and the validation of the boards in TIDK. When I arrived in the program direction, what was happening is that TI Nice and TIDK boards were different. They were using different memory, different components, of course different boards, and it makes sense to use different boards, because what they want to do in Nice is to validate all the chip, all the functionality. For example if it is used to work with three types of memory, they will do a connector being able to connect the three types of memory. Whereas on the RDP, the reference design board, what is going to be used is the memory that is elected to be in production. Which is going to be one memory. And if we ask TIDK to be able to have three memory they will say this is not possible, because then our board is being too much complicated, we are not able to fit in 4, 5, 6 layer, then it is more expensive and so on and so forth. So because of such problem, the board is different make sense, but I have to fight and have a lot of meeting to say to the guy, I understand that your board are different, I don't want that you have different components. I want the validation in Nice to have a version of the board that is 100 percent aligned with the reference design, and therefore you are going to have the same software you are going to have the same issue, and I have to fight for that. But it was an alignment. But what I discover is that in TIDK, when they were willing to make the validation of the boards, that is when they were willing to give the boards to the software and say it works, they didn't have the resources to develop all the software, so they were trying to get the software from the validation team and use this software on the RDP software, reference platform. But they were not willing to say that this was what they were doing. So when I realize that I say ok, you have five engineers working on the validation, they were working for one year, and in fact what they did, I'm quite sure that there was not five engineers on that. I just ask them, you give me all the bugs that they found. Because if I pay five engineers for one year, I'm expecting that they found some bugs. And they didn't find any bugs...

...So this is an example where TIDK was in the following mode, and they didn't, they were not able to find a win win with the validation team, they were just running after the validation team. They were trying to explain me, that the validation team were validating in a interface for example between the memory and the display, they were telling, TIDK was explaining me, yes we are validating a couple of memory location but we validating deeply everything, which is not true, so they were trying to bullshit me. And they were not able to convince me, and convince the others, that they were having added value in their validation, their side of the validation of the board." (Manager TI Nice)

Ask to his view upon why TIDK did it in this case, he answered the following

"Kristian Hegner Reinau: Ok so, just to understand right what, they were simply not doing it, was it because of resources or why didn't they do it, when they said they would do it.

Manager TI Nice: I think we are touching here an organization problem in TIDK. It was always surprising to me, how, how they, how they were communicating very very badly among themselves in TIDK. There were to big groups, the solution delivery group and the R&D group, which were not talking together very well. They were not talking together very well within the R&D between program A, B and C. They were not talking very well together within R&D between the guys making the software, for example the validation, or the board, the software team, and they guys in charge of the reference design. So I strongly push making sure that the program manager of the reference design was program manager as well of all the activities going on in TIDK. And for some programs it was working well, for some of them it was difficult, and the outcome of this is because, and it was not very well done in TIDK. You need to have a strong program manager to make it happen. If you don't have a strong program manager, then you fight between the R&D doing the validation, the R&D doing the software for the validation, and is not able to make it clear.

He also explained that, quote

"...sometimes I realize that even if they were in the same office they were not talking together. And sometimes I was doing conf calls to people to make sure that the two guys in the same office were talking together..." (Manager TI Nice)

This observation fits well with the view of a top manager in TIDK, with a carrier spanning positions in other TI sites, one of them being TI Nice. As described in the chapter "The Story of TIDK" this TIDK manager explained that that people in TIDK was not communicating very well together. So it seems plausible that there were different ways of communicating in TIDK compared to in TI Nice. We may on this observation, which illuminates a different work practice in TIDK compared to TI Nice, pose the boarder question: Were there different practices relating to the work in TIDK compared to other TI sites?

3.4 Different work practices

According to the interviews conducted there were different work practices in TIDK and in other TI sites. According to one of the TI Dallas manager, managers from TIDK tended to be more technical competent than managers in TI Dallas but they did not participate much in the coordination of work tasks between sites, and were instead more focused upon managing within TIDK, as he explained when asked about whether he saw any differences between TIDK managers and TI Dallas:

"Manager TI Dallas: I found them [TIDK MANAGERS] to be a lot more technical competent than managers in the US in terms of they are very experience in RF engineering, so they are good at managing their teams. I found sometimes that they didn't communicate as much as managers in the US, in terms of their communicating what their team is doing and the day to day priorities etc. etc. They weren't as visible as some US managers would be. They tend to let their team handle the interactions to other sites themselves rather than being in the middle of that interaction.

Kristian Hegner Reinau: Ok just to understand, does that mean that they were sort of, instead of focusing on managing they were focusing on the technical issues or

Manager TI Dallas: No, they weren't, I wouldn't say they were focusing on technical issues but they were focusing on managing just within the TI Denmark site, and organizing the tasks of the team and reporting these tasks to the managers in TI Denmark, and not making large efforts to reach out to other sites and coordinate across sites, whereas managers in the US typically spend a lot of time trying to coordinate across sites rather than just managing the team they have on their own site.

Kristian Hegner Reinau: Ok, I was sitting and wondering, now you say they were not that much into the management and relations to other sites, if there were a struggle about work

tasks and so forth, for example with France, did that then have an influence that they wasn't that active in the between site negotiations.

Manager TI Dallas: Yes, I think it did have an influence, because you know it resulted in sometimes this duplication of work, and in a case like that, that's were, you know you need maybe a strong manager to go in an force between different sites that one person just does one thing. In a case where people weren't reaching out and coordinating across sites things like that happen. So I think it contributed to that, yes."

He also had a view upon the management in TI Nice:

"I guess the first thing in TI Nice is there were very few managers, because they had one very large team reporting to one manager, and there had been different managers in that role. The first manger was very passive, and again didn't make any, didn't involve himself in interactions to other sites. The second manager they had was almost purely technical, and didn't spend time managing the team. So I think they really, the main thing in TI Nice was probably a lack of, you know, active management. There wasn't a lot of strong management in TI Nice" (Manager TI Dallas)

When asked about differences between TI sites the TI Dallas manager explained:

"Are there differences, I think, you know, I think sometimes that the management in Nice was not very, not always very involved in the process, and the management in Denmark was not, you know, communicating as much as they should, so a lot of the drive to kind of coordinate each sites task across sites may, used to come from Dallas in that case. So usually the difference will be that the Dallas people might be more vocal and trying to resolve these issues" (Manager TI Dallas)

He further had a view upon why TIDK managers did not participate much in the discussions with other sites:

"... I think maybe they weren't, the management there, maybe because it was a remote site, weren't maybe exposed enough, or feeling the heat enough, of the, you know, the customers deliverables, or the motivation and the desire to resolve an issue quickly. Maybe because they were remote they weren't always seeing that direct customer interaction whereas, you know, in the US, a lot of times we talked directly to the customer, and we'd feel the earth and see why it resolved faster." (Manager TI Dallas)

This could be interpreted in the way that managers in TI Nice used more of their time managing the relationships to other TI sites and focusing on overlaps etc. compared to managers in TIDK who were more focused upon managing within the TIDK site. If we go back to the discussion about leadership in TIDK, this could indicate, that maybe TIDK did not lack leadership as argued by the TI Nice manager, maybe the case was that the leadership practices in TIDK and TI Nice were different. And that TIDK management practice was more focused upon managing what was going on inside TIDK and less focused upon managing the relationship between TIDK and other TI sites. In other words, given the nature of the management practice found in TIDK and the nature of the management practice found in TI Nice, TIDK maybe seemed to lack leadership when it was seen from the outside by the TI Nice manager, because he compared the behavior of TIDK management to the behavior of TI Nice management.

The different management practice in TIDK compared to other sites is one dimension in which the work practice in TIDK was different compared to other TI sites. Another dimension was apparently in relation to planning of the work and the approach to the work. To understand this difference we should start by focusing on the way the work was planned in TIDK.

We can start with the views of two TI Nice engineers. Both had through their everyday work experienced a difference. One explained that TIDK had had more focused on process in the work than TI Nice, quote:

“...the plans are more oriented to serve the process in Denmark. There is a process that requests certain artifacts we produce for different checkpoints, and this is what we, let's say, these are the main driver for execution. This is what I could see from, let's say, Denmark perspective. From French perspective, it is more traditional way of considering this design. Starting from the definition and then doing some different steps to lead to the conclusion, but much, keeping as much as it is done from Denmark perspective to the strict process let's say...

... if you consider, for example on the schedule, if you look at one schedule coming from Denmark you will see that these are the artifacts, the deliveries for the checkpoint that will drive the schedule. If you look at the schedule from France, you will see that there is the overall execution that will drive the schedule, and the artifacts from the PCB will be an outcome.” (Engineer TI Nice)

He then elaborated on this notion of the artifacts, quote:

“...from Denmark there are this artifacts that are the data to be produced for the overall process, that are let's say the main drivers of the overall schedule. Whereas in the French approach it is more, we, let's say, we execute the program and we deliver the artifacts so, to stick to process, but it is not what will drive the program, it is something, the process will follow, let's say, the execution of the program and not the opposite...” (Engineer TI Nice)

This is how this engineer saw TIDKs behavior from his position in Nice. He could further tell about his experiences during a couple of years where he had worked in a TI site in San Diego, and these experiences supported his story. Around the time of his arrival in TI San Diego, a person from TIDK came to work on the site also, and this person incorporated some of the TIDK way of planning, as the engineer explains:

“... we arrive in San Diego almost at the same time with [NAME OF PERSON FROM TIDK], I think as we came maybe six months earlier. In that time there was no real process in place to address this type of activity, so this was one of the actions, to be taken by this San Diego site, which is let's say, tried to be a bit more structured. And what happen is that [NAME OF PERSON FROM TIDK] came there and tried to push this process. He did, and he bring, let's say, this Danish way of doing it in the US. This is what I could see at this time. Which by the way was a lot of added value because he tried to make sure that everything was captured and that everything was executed in a good way, nothing fell between two chairs let say, in the program.” (Engineer TI Nice)

The engineer further explained, that in the beginning the TI San Diego people had been a little surprised by this approach, but they adapted to it well. The view of another TI Nice engineers support this, he explained the following about the differences between TIDK and TI Nice seen from his perspective:

“And the point is basically, the difference, from my point of view, the main difference between here and Denmark is, let's say that at the beginning of the project, of, even at the beginning at the task, when we decide what to do and so on, we design also a setup, ok, the let's say hardware software configuration. And the point is when we start, for example the task can, let's say, that duration of the task can take over several weeks. Or even several months, sometimes. But let's say several weeks, and the point is for example, that after a few days of testing or validation or whatever on the task, we can notice that we can for example change the original settings, for example to change our initial settings to improve the performance and so on. And what we notice is basically Denmark doesn't like to do that. Let say at the beginning of a task we design a setup, even during the validation, during the execution of the

task I notice we can do, we can change the setup to get better performance and so on. They won't do it. They would like to go until the end of the task with the initial settings. And here our strategy is not like that. If we find, let's say, after a few days, even a few weeks, a better setup and so on, so we will stop and we will take this new setup and restart from this new setting and restart again the task. So the, let's say the difference at the end is basically that TIDK will be on time, always, ok, but here we are almost all the time, most of the time we were out of time due to fact that we wanted to restart again and again." (Engineer TI Nice)

The consequences of this were according to the engineer conflicts:

"Conflict, we had a lot of conflict actually, because we have some deadline, usually, these deadlines also are aligned with customers, according to the customer plan, because customers like to use our ICs, integrating to their new phone models. They have also their own planning, they have their own schedules, so the point is we have all the time some conflict because from let's say Denmark site they are saying, ok guys, we need to be on time, and to deliver the results, and the performances of the chip, and so on time. And here we are saying we don't want to deliver on time some bad performance, especially if we know that the chip is better than the result that we showed them" (Engineer TI Nice)

One TI Dallas manager gave a similar view upon the planning in TIDK, he explained the following:

"...what I did notice is, TIDK is, and I think it is mainly historical a little bit from their company's heritage, they are by the book. And they set a plan and they cannot deviate from the plan. And, so when unexpected events happen, they do tend to have a bit of a hard time dealing with unexpected events because it doesn't go by the book then. And so we struggle a little bit with them, because they have these checkpoints and even though they knew the checkpoint would fail, they went ahead and did it anyway, because, they had decided they were going to do it on this day, instead of just holding it up and fixing it before the checkpoint. Sometimes we struggle a little bit with them because they had these procedural things they wanted to get done. But on the other hand they delivered top notch documentation. Their documentation was, is impeccable. And again maybe because they keep all these checkpoints, and they have all these checks and balances. So the team, at least over here, has checks and balances but not to the same degree. And sometimes maybe a little bit more risk is taken here in Dallas." (Manager TI Nice)

The other TI Dallas manager interviewed replied the following when asked to whether there were differences between TIDK engineers and TI Dallas engineers:

"Manager TI Dallas: So, yes I find that the engineers from TI in Aalborg were very structured in terms of they made a plan, and they stuck to the plan and always delivered on the plan they had made. Whereas the work style in the US is sometimes a little bit more unstructured, and sort of tackle each issue as it comes up. So I noticed that difference between the two sites over time. Whereas the TI Aalborg folks would make a plan and sort of stick to it whereas in Dallas sometimes things are a little bit more unstructured.

Kristian Hegner Reinau: What, this difference, did that have any consequences within the organization

"Manager TI Dallas: It didn't have any negative consequence at all in the organization. I think I noticed that sometimes with customers, and especially with American customers, they would get a little bit frustrated with the structure, structured nature of TI Denmark, and the fact that they, you know, would stick to the plan they had made whereas some of the American customers we worked with have more the culture of, you know, flexibility, and change plans all the times, so I noticed in the customer interaction there were sometimes a small bit of friction there"

It is worth noting that the first issue this manager tells about is the planning issue. So these interviews of two TI Nice engineers and a TI Dallas manager draws a relatively coherent picture of TIDK having another practice in relation to the planning of the work compare to other TI sites. However, seen from the view of two TI Nice managers there were no difference. One argued that, quote:

“...well in TI more or less we don’t have a strong culture of making good plans and updating good plans and things like that. Still, TIDK, I think they are, they were more open to make progress in the planning and in the tracking of the plan than the others. And also we are in a world where everything is changing everyday. So TI culture in general is very open to any change. So there is no, there is nothing to say, no no the plan was like, go away with your change we will not do it. They were by this very flexible, and in term of making change, yes, they were proposing changes, like everybody, I would say, no more no less...” (Manager TI Nice)

The other argued that TIDK always open to take new challenges, maybe a bit too open to commit themselves, which contained both a positive side and a risk side, which has been discussed earlier. These views are however compatible with the views from the TI Nice Engineers and the TI Dallas managers, if we understand them in the following way: People from TIDK had a practice of being open and commit themselves to new tasks, but when they had done so, they created plans for how to solve these tasks and were less open to deviate from these plans underway in the tasks, which is the time where they would have been mostly in contact with TI Nice engineers. This explanation also fits with the point discussed earlier about TIDK managers being more focused than TI Dallas managers and TI Nice manager on managing within their site, i.e. within TIDK. Maybe they were more focused than managers from other sites on making plans for the work etc. within TIDK. We can compare this to the view from inside TIDK, were a manager had the following view upon planning practice in TI, quote:

“You have always had a very optimistic evaluation of time schedules in TI. You have sort of had an idea that you had to, you were allowed to give an optimistic view, get them [CUSTOMERS] in early, and have slightly aggressive plans, and rest on people finishing quickly. You always had to push and push and push to speed up the development. But what happens now is just that people say yes without have control of it, and that is not only here in Denmark. You say yes without having and foundation. Even though you think that this is going to take 3 to 4 more spins than what is officially said it may take, well, then you may only make a plan saying that is will take 2 more spin, or something like that, right. And everyone knows that in the end, well then we are going to make 5 or 6 or 7 or 8 spin on this before it works, right, unless it goes really well. And it never does. There will always be problems which you have not predicted. There will always be a problem with the chipset or some software, or with the board or what it is. Experience says so. But in regard to planning you are not allowed to plan more” (Manager TIDK)

In relation to the point about getting customers in early, we should remember, that according to another TIDK manager, it is normal practice in semiconductor companies to get customers involved early in plans to thereby save money, as he explained, quote:

“...the idea is to get them in early to do their job in the terms of evaluation, the reason for that is, to have them early involved is normally, if they get in too late, then you only find the errors on your side, but not when it is working in an application on their side. Meaning that in the end you end up making a spin only for the customer. And that’s the reason why TI, and any other semiconductor company, is forced to get in customers as early as possible. That’s the reason behind, because, there is real dollars behind it. Its cost.” (Manager TIDK)

One could ask if the approach to planning changed over time in TIDK. Unfortunately the data does collected not allow for a view upon that. It is, however, on the basis of the quote by the manager in TIDK interesting to raise the question: Were the strict approach to planning in TIDK, where TIDK would create plans and stick strictly to those, even though they knew the places would fail, as described by both the TIDK manager and TI Dallas managers, a protest reaction from TIDK against the planning practice in TI? Was it a sort of a protest from managers in TIDK that felt they were being overrun and pressed by the TI Corporation? Unfortunately it is impossible to say whether this is the case.

The practice regarding the management of the site and the planning of the work was apparently different between the TIDK and TI Nice, and the descriptions of this difference indicate a different work practice in TIDK compared to TI Nice. Another thing that seems to indicate the different work practice in TIDK compared to TI Nice is the following quote from an interview of a TI Nice manager, where he argues that TIDK managers are more concerned with their people than TI Nice managers, quote:

Kristian Hegner Reinau: ... are there differences between DU managers in Aalborg and DU managers in TI Nice.

Manager TI Nice: In Aalborg they are more willing, I think the people, people is more important in TI Aalborg than they are in TI Nice. So they pay attention to, they pay more attention to the people in TIDK, so the DU manager will pay attention to the people more than in France or in Dallas.

Kristian Hegner Reinau: Can you explain that I bit, I don't understand.

Manager TI Nice: Socialization, party, to communicate, they pay more attention to the people, human being is more, is better treated by DU managers in general in TIDK than in TI.

Kristian Hegner Reinau: Ok, but then I was wondering, if they pay more attention to the people, then why are there not so much information flowing there then. You said before that there was much overlap between what they do, and they did not talk much together, so

Manager TI Nice. Yes, but taking care of the people and putting in place meetings to share information to discuss about technique is a different world."

Another issue pointing towards there being another practice in TIDK is the following statement from a TI Dallas manager regarding how TIDK engineers approached the work during a working day:

"The other difference I guess [BETWEEN TIDK AND TI DALLAS ENGINEERS] is in work hours, where the TIDK would also have a quite structured approach of coming to work and then completing work at a certain time, maybe 4 5, and then maybe lock in later on a night. Whereas in the US, again a work day can be very unstructured, and we can be working from our home for a while, go home and work at home and work all evening, and emails and something, it was a lot more flexible, where as the TI Denmark workday tended to be a lot more structured as well" (Manager TI Dallas)

Some TI Nice engineers described the same issue. One explained the following about the differences between TIDK and TI Nice engineers:

"Engineer TI Nice: Yes, about conf call, like we have right now, and basically its true that, lets say for example we said, ok let's have a conf call today from 2 to 3, ok. And at 3 lets say that we havn't finished our conf call. Usually the Danish guys say ok, time is over, so let's schedule another meeting, another conf call, whatever. Sometimes they can say 4.30 I have to bring back my kids at school, whatever. So, and for us its true that, not like that, even if we do

meetings from 2 to 3, usually it is not finished, ok we will have to go on with the meeting. So it's true that they are more, let's say, square in terms of agenda of the conf call, in terms of timing for the conf call and so on. Here in France, we let's say, we are more, we are not really really, so well organized.

Kristian Hegner Reinau: Ok, do you think there are any consequences of these differences

Engineer TI Nice: I think TIDK is well better organized than in france. I can notice for example that in france here we learn lot of usual information even about a project, not during meetings and so on, we just run in at the coffee break, and, I know it's a bit like that, you know, it's a bit latin culture. And in Denmark it doesn't happen like that. They are very much more structured. They are well organized, and I can see that also for example between their RF team and our RF team. My team, when I started to work on my team, we were 6 engineers, ok. Now we are 15 engineers, and the differences between 6 and 15, we could not be organized in the same way. We have to share the information in a better way, we have to develop some tools and so on, you know. But we haven't done it. So it's really complicated and it's really a mess"

A TI Dallas manager also mentioned the issue of TI Nice engineers being less structured, when he was asked about how he saw differences between TI Nice engineers and TIDK engineers:

"Yes I noticed a lot of differences, again I guess back to the concept of structured work environment. I felt that TI in Nice are very informal and have their work in terms of not making plans, or making very loose plans on a project and sort of just tackling issues as they come up. Whereas in Denmark they were much better at making, you know, a project plan and sticking to it. I also noticed in TI in nice, the culture was very hierarchical, and that things had to go a certain way, to a manger or whatever, and I think it restricted sometimes their engineer to engineer conversations and cooperation between the two sites because the folks, the engineers in nice, preferred to participate maybe through a manager or someone else on their work task with Denmark and not always work directly together..." (Manager TI Dallas)

Having now presented some view upon TIDK that indicates that there are some differences between the practices related to the work at TIDK and at TI Nice we now only need to focus upon one question before it is time to round of the story of TIDK seen from the TI Nice and Ti Dallas. This question is: Did the location of TIDK in the NorCOM cluster have any influence upon the story of TIDK seen from TI Dallas and TI Nice?

4 The missing influence of the NorCOM cluster

None of the interview respondents from TI Nice and TI Dallas mentioned the NorCOM cluster, or more generally the wireless telecom industry in northern Jutland in the interviews unless they were asked directly about it. This suggest that seen from TI Dallas and TI Nice the location in the NorCOM cluster apparently did not have any influence upon the story of TIDK.

Let us therefore look at some of the replies given in the interviews when people were asked directly about whether they had heard about the NorCOM cluster. The answer of one TI Dallas manager educated at Aalborg University in the NorCOM cluster was:

"Kristian Hegner Reinau: Have you heard about that [THE NORCOM CLUSTER]

Manager TI Dallas: Not other than, I mean, so I graduated there in 96, and this was at the time that Aalborg University was just spewing out GSM engineers right, like crazy, and, so I left in 96 so I have never been part of it, but yes I have heard about it.

Kristian Hegner Reinau: Ok this, I was wondering, that TIDK was located in the middle of this cluster, have that had any consequences do you have a view upon that

Manager TI Dallas: Consequences for them or us or

Kristian Hegner Reinau: For TIDK or for TI in general

Manager TI Dallas: No I don't think that has had any influence. It might have been how that the initial, I don't know how the initial connection was made, I don't know which manager on what level decided to go to TIDK or ATL Research at the time and say, do you wanna be bought. I don't know how that acquisition was started.

Kristian Hegner Reinau: Ok, has the location, I mean now that you discussed, or when you told that last year it was discussed what should be the objective of TIDK within the TI organization, was it used, or did it have any influence that it was located in this cluster, I was wondering did, one could imagine that they would say well we have a lot of competences in this area and, this field, so we should do these tasks because there is a lot of work force and bla bla bla blab la and so forth. Has that been something you have heard

Manager TI Dallas: No, no, no, it was, it was more a personal level that we had a group of people that were experts in their fields and how, what should be their next task in their next programs coming along down the pipeline, what should be their task, right. And how do we make them well recognized inside the organization. So nothing about actually Aalborg and where they are from more than just, it was an organization and a well liked organization, it didn't really matter where they were from."

The other TI Dallas manager replied:

"Kristian Hegner Reinau: ... Have you heard about it [THE NORCOM CLUSTER]

Manager TI Dallas I have heard about it only from the, my colleagues in Aalborg. You know they say that the first mobile phone call, or GSM call, was made in Aalborg. And I think the headquarter of their Danish mobile phone company is there. And the university is quite good although I have only heard about it in terms of people working in TI Denmark. Outside of the, you know, working with folks in Aalborg, I have not heard of the cluster

Kristian Hegner Reinau: Ok, then, now you say you have heard it through TIDK, I was wondering, has it been used in work within TI that there is this cluster in the area. I mean for example in negotiations about what work tasks should be done were, then one could imagine that some would use the arguments to say well we have the competences in the region so it would be wise to place this activity here or something like that

Manager TI Dallas: No, usually conversations about work tasks would be solely based on the people you have at that time, so it will be more like we have this person and he's good at that. It wouldn't be about, you know, we could develop a competence over time."

One TI Nice manager replied:

"Kristian Hegner Reinau: ... have you heard about the NorCOM cluster consisting of telecommunication companies in northern Jutland.

Manager TI Nice: No can you tell me more about that.

Kristian Hegner Reinau: Ok there is a cluster up here, there has been a lot of companies here, Motorola, Ericsson, a lot of telecommunication companies up here. And I am doing my PhD project about how the presence of multinational corporation like TI influences the evolution of this cluster, so therefore I was kind of interested in hearing about whether you have heard about this cluster.

Manager TI Nice: I didn't hear about this cluster, but I knew that in Aalborg Copenhagen area there are a lot of telecommunication companies.

Kristian Hegner Reinau: Ok, can you tell me about what you have heard about it.

Manager TI Nice: So what I heard about is, of course Motorola close to ti Aalborg, I know that there is also Nokia, Sony Ericsson, so what I know is that this is very active, what I know as well, what I think I remember, is that in term of the students, there is also lot of activity in this area,

Kristian Hegner Reinau: Is the presence of these companies and so forth in the area, have that been used in the political games in TI, so for example, have the people from TIDK said well we have the competence in this area, so you should do this and that.

Manager TI Nice: To my knowledge no, I don't, I have no information about that."

One TI Nice engineer replied:

"Kristian Hegner Reinau: .. have you heard about the NorCOM telecommunications cluster in Northern Jutland

Engineer TI Nice: I don't follow you

Kristian Hegner Reinau: Its because there is a cluster of companies surrounding TIDK, there have been, Motorola have been here and Ericsson and Nokia and Analog Devices, Freescale Semiconductors, and I was just interested to hear if you had heard about this area and the companies up here.

Engineer TI Nice: Yes, so what is your question again

Kristian Hegner Reinau: have you heard about this area and the industries up here, now you have had relations to TIDK. I was just curious if you also had heard about the other companies up here or it was just TIDK.

Engineer TI Nice: I don't, so I know, Aalborg for example, we know that Aalborg for example from the RF side is very very well known. Especially first point is Aalborg University, they deliver some very very, very very good engineers in the field of RF, the RF field, specially because they have a very good university. And then apart from that we know that there is a lot of, it true, there is a lot of companies with RF skills there, but personally I haven't worked with any other company in Aalborg, other than TI."

In relation to the RF skills in Aalborg he elaborated:

"Engineer TI Nice: It's a worldwide, it is not only because I'm the RF, I'm working on the RF of course, but from RF yes it is a worldwide known place, for the RF engineering. You were saying something else about Aalborg

Kristian Hegner Reinau: Are there other competences Aalborg is known for within the industry

Engineer TI Nice: No."

A second TI Nice engineer replied:

"Kristian Hegner Reinau: Have you hard about this NorCOM cluster of telecommunications companies in Northern Jutland

Engineer TI Nice: No

Kristian Hegner Reinau: But you know there is a, there has been quite some companies up here with Motorola and Ericsson, do you know that

Engineer TI Nice: Yes, and I think it is tied to the fact that there is a good university, right, and the [NOT POSSIBLE TO HEAR THE WORD IN THE RECORDING] is that, that make all these companies that come here in the area.

Kristian Hegner Reinau: Ok, is the university or the companies are they known for some special competences or, around the world, or, what is your view on that.

Engineer TI Nice: What I know on my own is that, so there is a company in Aalborg, I don't know the name of the company, but that these, provide on the market some good engineers at telecommunication level, so RF is one of the let's say, I would say one of the aspects of this telecommunication here. And then I do know of, or believe, that this is one of the reasons why there is quite a lot of companies such as you said, maybe RF Micro Devices, Ericsson as well, I think Infineon, Motorola, TI and so on, that came here.

Kristian Hegner Reinau: Ok, the presence of these competences in the Aalborg area and the other companies, had that been used in arguments within TI, in discussion about work split and so forth. Have you experienced that

Engineer TI Nice: I don't think so, but I, not to my knowledge. Not to my knowledge."

A third TI Nice manager replied:

Kristian Hegner Reinau: Have you heard about the NorCOM cluster consisting of telecommunications companies in Northern Jutland around Aalborg:

Engineer TI Nice: No

Kristian Hegner Reinau: Have you heard about the telecommunication industry up here

Engineer TI Nice: In Aalborg you mean

Kristian Hegner Reinau: Yes

Engineer TI Nice: Yes, I know that GSM was more or less invented in that area I would say. At least it started, there is lots of companies who started GSM and, in Aalborg.

According to this manager the location of TIDK had not had any influence upon dynamics within TI. A fourth TI Nice engineer also replied that he had not heard about the NorCOM cluster or the telecommunications industry in Aalborg and that he did not know much about Aalborg. Having now focused on how the NorCOM cluster was seen from TI Nice and TI Dallas, it is now time to end the story about how TIDK was seen from the outside.

5 Different views one conclusion?

The goal of this chapter was to elaborate upon the story told in the chapter "The Story of TIDK" by presenting the views of a handful of managers and engineers from TI Nice and TI Dallas, who had been in close contact with TIDK, and because of this were able to tell the story of TIDK as seen from the outside.

The reason for doing this was that these persons constitute a group of people who, due to their experiences, were able to tell about differences between the sites. And through understanding these differences we can create a better understanding of some of the dynamics causing the changes we say in the story of TIDK. The question to ask now is therefore: what can we learn from these two stories, i.e. from "The story of TIDK" and "TIDK from the Outside"?

This question will be the issue of the following chapters in this book, where I shall analyze these empirical stories. Before embarking on this journey let me summarize on some of the issues that were illuminated in this chapter.

First there was the issue of the acquisition of ATL Research as it was seen from TIs point of view. Secondly we touched upon the changes within TIDK and more importantly the changing position of TIDK within TI. The chapter “The Story of TIDK” told the story of TIDK as it was seen from the inside, i.e. from managers and engineers in TIDK, and that story illuminated some of the changes occurring inside TI. This chapter has also told a story of changes relating to TIDK, but this has been more focused upon the changing position of TIDK within the TI Corporation. For example the question: What dynamics caused TIDK to lose its position as the center of the RF competence within TI? In pursuing this question this chapter presented different views upon TIDK and the behavior of managers and engineers within TIDK as they were seen from the outside. This related especially to the political games within TI and the dynamics and cultural issues influencing the behavior of TIDK in these games, which as we saw, have had a relatively large influence upon the story of TIDK seen from the outside. The cultural issues related to the issues of TIDK people being naïve, of TIDK people having a culture of being open, being proud of their work, producing solutions of a high quality, understanding the term commitment differently than people from TI Nice, of TIDK people being shy compared to people at other TI sites. These differences have apparently influenced the behavior of TIDK within TI, and the characteristics have had both positive and negative sides to them. We saw for example how a TI Nice manager always had values the openness of TIDK. On the negative side, however, we also saw how some of the characteristics of TIDK apparently were working against TIDK in the political games within TI. A shy culture for example was not promoting in a TI culture where people had to should loudly to be heard and get influence. The discussions about the work split between TIDK and TI Nice further illuminated how the political game and the characteristics of TIDK had influenced the story of TIDK. The section on the work practices underlined that TIDK did have another practice related to the work than TI Nice. Finally the section on the NorCOM cluster showed that seen from the outside the cluster have apparently not influenced the story of TIDK.

The story of TIDK is going to be form the basis for a scientific work in the following chapter, however, before turning to the analysis of the story, I would like to use this opportunity to take step back from the scientific investigation and say that it have been a huge experience personally to followed the fate of TIDK for 3 years¹⁷. It has also made it clear to me, that there is both a scientific side and a personal side to this story. From a scientific standpoint is has been very interesting to follow the story of TIDK at close hand, and see the whole life of an acquired company, from acquisition to closure with all the dynamics involved. On the other hand, personally, it has also been interesting to follow the company, but very sad to see the end of the story. I have come to know some of the people from TIDK through the study, and I was really hoping to the end, that TIDK would survive, or at least be bought by another company. But the end was not to be like that, and I was really sad to see all the people from TIDK, who had been so helpful to me though the years lose their jobs. Therefore I will like to underline that the story which has been told here shows the fate of many good people. Let me therefore end this chapter with what a TI Nice engineer wished to say, when I asked if he had anything to ad in the end of the interview, because this illustrates one of the personal fates involved in the story:

¹⁷ My first contact to TIDK was in the spring of 2006 when I interviewed the, at that time, top manager at TIDK in relation to work on my master thesis. After concluding my master thesis I started my PhD project in the summer of 2006, working on the same theoretical topic, and continued the contact to TIDK that had been established in my master thesis. My contact to TIDK ended when the company closed on the 1st of April 2009.

“... And I am very sad, again, to know, that I will probably never come back to see my former colleagues over there.” (Engineer TI Nice)

Chapter 8: The story of the NorCOM cluster

Let me begin this chapter by telling the conventional story of the NorCOM cluster, which has already been told several times in scientific papers as well as in the news media. In this chapter I will rewrite this story, and therefore it is appropriate to begin by presenting it in its current form.

8.1 The conventional story about the NorCOM cluster

The conventional story starts in Northern Jutland, a region that has been characterized by fishery, farming and heavy industries in Aalborg such as a number of concrete factories as well as two shipyards. Already in the 1940s an electronic industry started to emerge in Northern Jutland, and the roots of the NorCOM cluster can be traced back to when the company SP Radio was started, founded by Simon Pedersen. The first business area of SP Radio was radio and television. In the 1960s the company shifted focus to professional maritime equipment (Dalum 1995). The reason for this, was probably that a relatively large fishing fleet existed in Northern Jutland at the time and thereby a market for such equipment. In the 1960s there was a relatively small focus on this market segment, and SP Radio gained a leader position in that area (Dalum 1995). The companies originally dealing with maritime communication and navigation saw, in the 1980s, an opportunity to move into mobile communication, a market which was just emerging at the time.

The two large mobile phone companies, which emerged in Northern Jutland in the 1980s, were Dancall and Cetelco. The timing of these companies meant that they rode the wave of the first generation mobile phones that hit the market, the so-called NMT telephones. This success resulted in the growth of these companies, and they became fairly large in this new emerging market.

As the mobile phone market took off and sales figures exploded, the technology moved into the digital domain, with the advent of the digital GSM technology, the second generation of mobile phones, in the early 1990s. The two companies in Northern Jutland followed this move, and due to the cost of this new and more complex technology, they formed a joint venture company, DC Development, to handle the development of this new technology. This joint venture company was located in the newly opened Science Incubator Park, NOVI, next to the local university AAU (Aalborg University).

DC Development did succeed in developing GSM technology and Dancall and Cetelco was capable of presenting GSM phones almost at the same time as the other big players in the industry, such as Ericsson, Nokia and Motorola. The development process, however, left both Dancall and Cetelco in financial problems, and foreign multinational corporations acquired them afterwards. Dancall's and Cetelco's problems in the 1990s coincided with a phase where the local university was producing a number of skilled engineers in the field, and a phase in which the local science incubator park NOVI turned into a dynamic environment with a number of small high-tech companies set up by engineers, who came either from the university or started their own companies after having worked for some of the large companies. ATL Research which became TIDK, as discussed in the previous chapter, was one of these cases, founded by three engineers who left Cetelco and rented office space in NOVI.

The success of small high-tech companies in the region happened at the same time, as Dancall and Cetelco were struggling for their lives, and Dancall changed owners several times. Many of the new companies were acquired by large multinationals in the late 1990s and during this

phase the cluster changed in nature, becoming a cluster characterized by R&D companies owned by the largest players in the industry, such as Nokia, Ericsson, Siemens, Motorola and Texas Instruments. One of the issues causing trouble for the companies during this phase was a lack of engineers in the region. Given the dynamics in the industry with AAU, NOVI and the large foreign-owned R&D companies, as well as small local high-tech companies emerging continually, a business club was formed in 1997, the so-called NorCOM association. This was a business club for the telecommunications companies in the region, and it was made more official in structure in 2000 where the first annual general meeting was held, and the articles of association were passed.

Then around 2001 the IT bubble burst, causing some lay-offs in the region, which in turn gave rise to a discussion of future directions. Both industries as well the university and Aalborg municipality and the North Jutland County took part in this discussion through initiatives such as the report "Vision Nordstjernen". At the same time, in the early 2000s the next generation of mobile phone technology, the third generation, UMTS was beginning to enter the scene, and a discussion became whether the companies in the region could make the jump, technologically, from 2G to 3G technology, as they had done in the early 1990s from 1G to 2G technologies. This discussion continued to the middle of the decade, where the companies in the region, now almost exclusively foreign owned R&D companies, had continued to grow. Remember, that the time around 2006 was also when TIDK topped as one of the absolute biggest success stories in the region.

Then things started going downhill. A number of companies pulled out, a process culminating around Christmas 2008-2009, where two of the largest R&D companies, Motorola and Texas Instruments, were shut down, as other companies in the industry was laying people off fast. This situation led to a discussion in the media of whether the cluster was dead or not. Subsequently, the NorCOM association was merged with the IT Forum organisation, representing the IT industry in Northern Jutland in 2009. Since then it has been unclear what the state of the industry in the region is.

So this is the conventional story. In the analysis in this chapter I will pose the phronetic how question: how did the NorCOM cluster emerge as it did? Which discourses and practices made it possible to discuss the NorCOM cluster as a cluster with certain characteristics? How did these discourses and practices emerge, and what was their descent? By analyzing this I will seek to create a new story about the NorCOM cluster, which analyzes the cluster from a different perspective which has never been utilized before. This analysis will be the basis for the final discussion in chapter 9 where I will analyse the discourses and practices identified in the TIDK case and the discourses and practices identified in this NorCOM case to answer the research question posed in chapter 5.

To begin writing this new story, the first issue we may look at is the background for the telecommunications industry in the region, and the discourses, which emerged in the early years surrounding this industry. The first question to ask is therefore, how did companies in Northern Jutland enter the wireless communication industry? To understand this, we need to look at the history of the region, and the move into the wireless field. In the 1980s two other companies, Dancall and Cetelco also made the move into the wireless field (Dalum 1995), and let us have a look at the rationality for this. Because of the available resources I have decided to narrow the focus to one of these companies; Cetelco.

8.2 The journey into the mobile industry in Northern Jutland

Two engineers Erik Rauff and Erik Sørensen, who owned the company Rauff & Sørensen A/S, started Cetelco. According to them¹⁸ their venture into wireless mobile communication started out of technical considerations. This section will explain this and it builds on a interview of the two conducted in 2010 (Rauff & Sørensen 2010).

Rauff & Sørensen A/S was a company producing maritime navigation equipment. One of the technologies which Rauff & Sørensen A/S had been focusing on was the Polaris system, which could give ships around one position each hour. Back then, in the early 1980s, such navigation equipment was relatively expensive, costing around 20-30.000 dollars for an American produced system. Rauff and Sørensen realized that they could produce similar equipment at a significantly lower price of around 4.000 dollar. They therefore went ahead and did so, believing that their market would probably be the fisher fleet and pleasure crafts in northern Europe. It turned out, however, that their first large market were tuna-fishing vessels in the pacific, which where, at the time, relatively lost on the huge ocean.

After this success, Rauff and Sørensen looked into other types of navigation systems, one being the Decca system, originally developed by the British company Decca. This system was also an expensive piece of equipment, and again Rauff and Sørensen produced a high-quality navigation system using the Decca technology, but sold it at around 20% of the price of the original British equipment, which gave significant sales as well as law suits from Decca. At one time Rauff and Sørensen had ongoing court cases with Decca, who believed that they had the rights to the system, in 4 or 5 countries simultaneously. In the end the European commission decided in favour of Rauff and Sørensen, and when that happened Rauff and Sørensen already had a market share around 80 percent, because they had been the only company who dared to go against Decca. According to Rauff and Sørensen, another reason for this success was the fact that Decca had had a monopoly before and were therefore relatively slow in changing and improving their equipment, making it relatively easy for Rauff and Sørensen to compete.

Having 80 percent of the market for maritime navigation using Decca equipment, time was again ready to look into new technologies, which could succeed the Decca equipment, and so the two engineers did. Their interest fell on the Global Positioning System, GPS, which was emerging in the middle of the 1980s.

Rauff and Sørensen developed a GPS navigation system using the first generation of GPS technology and the signals from the prototype satellites in orbit at the time. They decided that this was the way to go in the future, and prepared production, so that they could hit the market when the first production satellites came into orbit. Then the Challenger disaster happened in 1986, which grounded the space shuttle, and thereby delayed the production satellites. The competitors in the GPS field used this break to start development on the second generation of GPS receivers, and this was a difficult situation for Rauff and Sørensen who had used a significant amount of resources on developing the expensive technology. However, they could see that a market would exist for this technology, so they joined the development race for the second generation. They also knew, however, that the maritime market would be relatively limited, as they had seen in relation to the Decca system. Further, given the new GPS technology they had to invest in new production technology in their factory. And this led to a eureka moment for Erik Sørensen, who had been reading about the new mobile telephone technology, the NMT technology, booming at the same time.

¹⁸ I interviewed Erik Sørensen and Erik Rauff in a double interview in 2010.

The two engineers realized that seen from a technologically point of view, a GPS receiver, at the time, and a NMT mobile telephone, was approximately an equal challenge seen from an engineering perspective. Therefore, if they could produce a GPS receiver, then they could also produce a mobile phone. Further, and importantly, they would be able to produce both telephones and GPS receivers with their new production technology. So given the skyrocketing sales of mobile phones they decided to produce mobile phones too. And so they did. And as they admit today, this decision was based solely on the technical issues and on the fact that a lot of phones were being sold.

This also meant that they did not know much about the market they when they started their venture. For the entry they created the company Cetelco, which is shorthand for CEllular TELephone COmpany led by Erik Sørensen to handle the development and production of mobile phones.

The effects of the lack of knowledge about the mobile communication market soon became clear for the two engineers. The maritime market they were used to work with was relatively small and well-confined, and the market was relatively conservative regarding changes. Further the players in this market were relatively small companies similar to Rauff and Sørensen's companies. The mobile market on the other hand was huge, moving extremely quickly, and Rauff and Sørensen came up against relatively large players.

As the technology moved along from the first generation of mobile phones, the analogue phones using the NMT, Nordic Mobile Telephony standard, towards the second generation of phones, the digital GSM, Global System for Mobile communication standard, in the late 1980s and early 1990s, a piece of extremely expensive development work lay ahead.

Rauff and Sørensen, as well as the owners of the other large mobile phone company in Northern Jutland; Dancall, saw this coming, and therefore they created a joint-venture company to do this development. This was the beginning of DC-Development in 1988. This company was placed at the newly created science park NOVI, which was neutral ground for the two companies, and close to the local university.

The original idea behind the venture was that Cetelco and Dancall should both deliver employees to the project, and after the necessary technology had been developed they would return to the companies with the technology, and each company would then produce its own phones using this technology. As work in DC Development progressed people realized that the development would be even more expensive than expected, and therefore a closer cooperation between Dancall and Cetelco was planned. A work split was made so that Dancall would handle the software part of the phone and Cetelco the radio, and then the two companies would use the same modules in their phones but put different covers on them. This way the cooperation stretched from the R&D phase and into the production phase.

So by 1990 Cetelco and Dancall had joined forces in the GSM development race, and as such the region had become a player within the telecommunication industry. The important point to take from the story above is the fact that the move was made due to technological considerations in the case of Cetelco.

People have told me in different interviews and conversations that it was the same rationality in the case of Dancall, but since I have only heard this from people who were not directly part of the decision-making process in Dancall, the claim cannot be validated through my interviews and conversations alone. However, and this makes it plausible, an analysis of more than 800 newspaper articles as well as scientific papers, which I will return to later, show that business

capabilities, marketing knowledge and organizational knowledge were apparently missing in Dancall. This, along with the interviews and conversations, makes it plausible, that the move into mobile communication also occurred with a technological rationality in the case of Dancall.

To sum up, by 1990 two companies in Northern Jutland have made the move into wireless communication, and we know for sure, that one made the move out of technological considerations, and the available empiric data suggest that it is likely that the other company also moved into the mobile industry out of technological considerations.

The growth of these two companies and their move into the wireless field did of course not happen in a vacuum in the region, other institutions and organizations supported the move. A number of technical knowledge institutions were established in Northern Jutland in the 1960s, Aalborg University Center (AUC), which later became Aalborg University (AAU), was established in 1974, and Nordjysk Videnspark¹⁹ (NOVI) was established in 1988. Throughout the years, according to interviews, the environment at AAU has supported the wireless industry in the region, indeed many of the engineers that form the network of key persons, which has been the core of the NorCOM cluster, which I shall return to, has been educated at AAU, and know each other from AAU. They later went on to work together in some of the first companies in the cluster.

Therefore, to understand how the NorCOM cluster emerged, it is necessary to take a closer look at the industry as it were around 1990, what was present in the region, what dynamics were operating, and how were it articulated. This is important because this environment was the one where the idea for the NorCOM cluster grew during the 1990s.

8.3 The telecommunication industry in Northern Jutland around 1990

To illuminate the situation in the telecommunication industry in Northern Jutland as it was around 1990 let us first turn to the first scientific report describing the industry.

8.3.1 The first report dealing with the industry

"An "Industrial Milieu" in the electronics industry in Northern Jutland" (Gelsing & Brændegaard 1990), of which I have a print from the second edition of the report in 1990, the first edition came in 1987, is as far as I have been able to uncover the first time it is articulated, that the electronics industry in Northern Jutland, and especially the wireless part of this, constitute a industrial milieu. In (Gelsing & Brændegaard 1990), the term Industrial Milieu is described as, quote:

"an environment, where new ideas spread quickly, are professionally assessed, and may again give rise to new ideas, products and production methods."

"et miljø, hvor nye ideer hurtigt spredes, vurderes professionelt, og måske atter giver anledning til nye ideer, produkter og produktionsmetoder." (Gelsing & Brændegaard 1990, p.6)

The research presented in this report investigates electronics companies located in three municipalities; Aalborg, Støvring and Pandrup. The companies in these three municipalities are chosen using both an industry dimension and data on the whole electronics industry in Northern Jutland, as well as a geographical dimension, and it must therefore be concluded that the core of the electronics industry in the region is located in these three municipalities. The report is interesting, because it gives us a view upon what companies which were present in the region at the time, and how the situation among these companies was articulated, i.e. what challenges they had.

¹⁹ Nordjysk Videnspark can be translated into North Jutland Knowledge Park

8.3.1.1 The electronics industry in Støvring

The electronics industry in Støvring is according to (Gelsing & Brændegaard 1990) dominated by one large company focussing on maritime communication equipment and mobile phones, and it employs more than half of the total amount of workers in the industry in the municipality. Triangulating with other sources, this company, which is anonymous in the paper, can only be Cetelco. Digging into the description of the company in the paper, we see, that the reason why it was formed was, according to the two founders, who came from another large company working with maritime radio, that this company had become too large and bureaucratic, quote:

"The two owners of the current communications company say that a decisive factor in establishing their own business was that the original marine radio company had become too big. The growth had meant sharper internal division of labor, and the information levels in the old company's development department steadily deteriorated. The same people are today leading a company with approx. 320 employees."

"De to ejere af den nuværende kommunikationsudstyrs virksomhed oplyser, at en afgørende faktor for etableringen af egen virksomhed var, at den oprindelige marineradiovirksomhed var blevet for stor. Væksten havde betydet skarpere intern arbejdsdeling, og informationsniveauet i den tidligere virksomheds udviklingsafdeling ringere og ringere. De same personer leder i dag en virksomhed med ca. 320 ansatte". (Gelsing & Brændegaard 1990, p.22-23)

This telecommunication company is presented as one among a number of electronics companies in Støvring municipality, the other companies in the study in Støvring municipality includes for example a PCB company, an assembly company and a serigraphy company. The conclusion of (Gelsing & Brændegaard 1990) is that an industrial milieu exist in Støvring, because although all the companies are not participating equally, an information network has been created among the companies, and a number of the companies have significant customers inside the municipality.

8.3.1.2 The electronics industry in Aalborg municipality

Aalborg municipality has, according to (Gelsing & Brændegaard 1990), never been marketed as a electronics municipality, and the electronics industry only employees around 700 people in the municipality, which is low, given that the municipality has had several companies employing more than 700 people in their own right, for example Aalborg Portland and Aalborg Værft.

As in the case of Støvring, the largest company in the sample in Aalborg municipality is also a producer of mobile radio equipment, mainly Marine VHF. This company is Shipmate, which can be identified by triangulating the description in (Gelsing & Brændegaard 1990) with other sources where the companies are not anonymous. The two largest companies in the electronics sector in Aalborg Municipality, SP Radio, and a PCB company, employ around 70% of the workers in the electronics industry, but the two companies do not conduct business with each other. A number of companies in the sample in Aalborg municipality, chosen by (Gelsing & Brændegaard 1990), conduct business with companies in Støvring municipality.

Other electronics companies in Aalborg investigated by (Gelsing & Brændegaard 1990) is a medico company, a smaller company with 4 employees that work with telecommunication, a company working with alarms and a company working with industrial control-systems. The conclusion drawn by (Gelsing & Brændegaard 1990) whether an industrial milieu exist in Aalborg municipality is negative. The rationale for this is that there is no significant cooperation among the companies, and no significant knowledge sharing amongst them either.

8.3.1.3 The electronics industry in Pandrup municipality

In Pandrup municipality one single company accounts for 90 percent of the total employment in the electronics industry, and this company is specialized in mobile radio communications equipment. Triangulating with other articles this anonymous company must be Dancall. The second largest electronics company is focused upon hi-fi equipment, especially loudspeakers, and the two smaller companies in the sample are a spin-off from the hi-fi company as well as a company working on electronic impulse modules.

The conclusion drawn by (Gelsing & Brændegaard 1990) on whether an industrial milieu exist in Pandrup municipality is also negative as in the Aalborg case, and the rationale is similar; there is no significant cooperation among the companies, and no significant knowledge sharing among them either.

8.3.1.4 The relationship between the industry in the three municipalities

Looking at the cooperation and flow of goods between the companies (Gelsing & Brændegaard 1990) argues that if focus is placed only on companies within the telecommunication segment of the electronics industry, then a so-called "intense" trade exists between the companies in the three municipalities, quote:

"Conversely, it is clear that, if one only considered the group of companies that have "production chain-like character" within the mobile radio communications- and navigation equipment (PCB, pre-charger keyboard etc, electronics assembly, production of finished appliances), there is a relatively intense trade. The companies that are not part of this production chain, has no recorded trade."

"Omvendt kan det konstateres, at betragter man udelukkende den virksomhedsgruppe, der har "produktionskædelignende karakter" indenfor mobilt radiokommunikations- og navigationsudstyr (print, forlader tastaturer etc., elektronikmontage, produktion af færdige apparater), er der en forholdsvis intens samhandel. De virksomheder, der ikke indgår i denne produktionskæde, har ingen registreret samhandel." (Gelsing & Brændegaard 1990, p.39)

This is the passage, in which the existence of a group of interconnected companies within the telecommunications field in Northern Jutland is articulated for the first time. And as such, one can also say, that this is the passage, where the existence of "that something", in the form of a collection of interconnected companies, is articulated for the first time, and this "something" will later be constructed into a district, and later a cluster, and finally become the NorCOM cluster, through different discourses.

(Gelsing & Brændegaard 1990) also illuminated the internal dynamics of this "something" in more detail, and in doing so there, we also find the passage where the presence of a "unity" among the telecommunications companies is articulated for the first time. This happens in the section of the report, where (Gelsing & Brændegaard 1990) look at what they call "formalised information exchange" among the companies. One formalised project stands out, and this is between two of the larger telecommunications companies, Dancall and Cetelco, which is working together on an integrated circuit for a new telecommunication standard. Triangulating with other articles it is possible to conclude it is the DC Development joint-venture to develop the GSM technology (Gelsing & Brændegaard 1990) are writing about. They write the following about this project:

"The establishment of this cooperation within the framework of Nordjyllands Videnspark (NOVI) came as a surprise to us for several reasons. First, because the two companies in question were known to "exchange" highly qualified manpower with each other. Besides a strong competition for this type of labor, the companies are also competing on the product

that will be sold on a highly regulated market (the telecom providers' approval of devices and issuance of user numbers). "

"Etableringen af dette samarbejde indenfor rammerne af Nordjyllands Videnspark (NOVI) kom som en overraskelse for os af flere grunde. For det første fordi de to virksomheder, de drejede sig om, var kendt for at "bytte" højkvalificeret arbejdskraft med hinanden. Udover en kraftig konkurrence om denne type arbejdskraft er virksomhederne også konkurrerende om produktet, der bliver afsat til et særdeles reguleret marked (teleselskabernes godkendelse af apparater og udstedelse af brugernumre)." (Gelsing & Brændegaard 1990, p.41-42)

Further underlining the puzzling in this cooperation, they move on to quote a manager from a third company, who say the following about the possibilities of cooperation between the two companies in NOVI:

"It is clear that if (the one large mobile phone manufacturer) has a revolutionary mobile phone on the way, they will not want their people to sit and talk with people from (the other major mobile phone manufacturer), and although they work together on something else, they will not want them to sit and talk together during a coffee break"²⁰

"Det er jo klart, at har (den ene store mobiltelefon-producent) en revolutionerende mobiltelefon på vej, så vil de ikke have deres folk til at sidde og snakke med folk fra (den anden store mobiltelefonproducent), og selvom de arbejder sammen om noget andet, vil de heller ikke have dem til at sidde og snakke sammen i kaffepausen" (Gelsing & Brændegaard 1990, p.42)

As can be seen from this the two companies are competing. (Gelsing & Brændegaard 1990) go on to argue, that it turned out, in their research, that the reason for the cooperation was the fact, that a new standard for telecommunication had been decided upon by actors in the telecommunication field in Europe, a standard which should be operative from 1992. The cooperation should therefore be seen as a result of this standard, which means that the two companies, Dancall and Cetelco, who are both relatively small on a European scale, have found it necessary to cooperate to avoid being outpaced by larger players in the industry. As they argue:

"A strong external pressure has always been favorable to ensure internal unity. The two companies state that the design of equipment for the new standard is their biggest challenge over the next few years"

"Et kraftigt ydre pres har altid været gunstigt for at søge indre sammenhold. De to virksomheder oplyser, at konstruktionen af apparater til den nye standard er deres største udfordring i de nærmeste år" (Gelsing & Brændegaard 1990, p.42)

As we know from the previous section, drawing on interviews with Rauff and Sørensen, this was indeed the case, Rauff and Sørensen did decide to cooperate with Dancall, and vice versa, to lift the challenges posed by the new standard.

So (Gelsing & Brændegaard 1990) articulate the existence of a company group with "production chain like character" within the telecommunications industry in the region, in which flows of knowledge and goods occur, and they further articulate the presence of a unity, a cooperation among companies in this group, caused by pressure from the outside.

What we have here is two of the building blocks, discursive elements, for the whole system of discourse which will emerge in the course of the next 15-20 years, in which NorCOM is constructed, the first one being the presence of a group of companies within telecommunications

²⁰ Translated

where flows of information and goods occur. The second block is the “unity” among these companies, the cooperation, which is created as a reaction to the pressure from telecommunications companies outside the region.

We also find in the same section the first articulation of a rational for re-articulation of this story. (Gelsing & Brændegaard 1990) writes:

"The collaborative project described has often been mentioned in connection with the marketing of Novi, which is hardly surprising"

"Det omtalte samarbejdsprojekt er ofte blevet nævnt i forbindelse med markedsføringen af NOVI, hvilket ikke kan undre" (Gelsing & Brændegaard 1990, p.42)

We see from this quote, that the science park, NOVI, has a rational from a marketing perspective in promoting the joint-venture between Dancall and Cetelco. This rational will continue as we shall see in the following, furthermore, the university will also find a rational in promoting the “group of telecommunications companies” as we shall see later on.

Let us now turn to how this company group with “production chain like character” within the telecommunications industry in the region becomes a cluster. The next step towards this is also taken by (Gelsing & Brændegaard 1990), in a section on knowledge networks within the industry, in which they articulate the similarities between Silicon Valley and the group of telecommunications companies in Northern Jutland. They focus upon spin-off and its meaning to such a group of companies, and highlights Silicon Valley as the best-known example of what they call, quote “business creation and knowledge diffusion through spin-off” (Gelsing & Brændegaard 1990, p.42). They explain in that section, that almost all semiconductor companies in USA are founded by key-persons who all had a relation to Fairchild semiconductors, the so-called Fairchildren. On the emerging environment in the 1950s and 1960s they write:

"People in this environment frequently changed workplace, possibly started their own businesses and took the knowledge with them. This often gave rise to personal conflicts and issues. However, developments in technology were so fast that there was enough for everyone, which was very conducive to the spreading"

"Folk i dette miljø skiftede hyppigt arbejdsplads, startede eventuelt for sig selv, og tog viden med sig. Det gav ofte anledning til personlige konflikter og spørgsmål. Udviklingen i teknologien var dog så hurtig, at der var nok til alle, hvilket var meget befordrende for spredningen" (Gelsing & Brændegaard 1990, p.43)

They then move on to arguing that the same can be seen on a smaller scale in Northern Jutland:

"What does world history has to do with the electronics industry in Northern Jutland? The scale is undeniably different but there are nevertheless some structural similarities that are worth noting. One can, with some fairness, say that substantial parts of the electronics industry in Northern Jutland are "SP's children""

"Hvad har verdenshistorien så med nordjysk elektronikindustri at gøre? Størrelsen er uægtelig forskellig, men der er ikke desto mindre nogle strukturelle ligheder, som er værd at bemærke. Man kan med en vis rimelighed sige, at væsentlige dele af Nordjysk elektronikindustri er "S.P's børn"". (Gelsing & Brændegaard 1990, p.43)

The point is, that the knowledge network, as (Gelsing & Brændegaard 1990) call it, within the telecommunications industry in the region consist of a group of key persons, most of whom have a relation to SP-Radio, where they have been working before moving on to other companies or starting their own. With respects to the company SP Radio, (Gelsing & Brændegaard 1990) ar-

gue, that this company, no doubt, has been a company with a management style which has generated sparks, and thus created a dynamic environment.

With respect to the younger companies, the so-called “SP’s children”, (Gelsing & Brændegaard 1990) argue, that some of these has been stable while others have been more fluent in nature. What characterizes them as a group is a focus on technology and a lack of competences within business and financial management in parts of the environment, quote:

"Some of these business formations in the electronics environment in Northern Jutland are stable. Others are more volatile. Much suggests that the technical skills have been high, whereas business acumen and financial management have had less comfortable conditions within parts of the environment."

"Nogle af disse virksomhedsdannelse inden for det Nordjyske elektronikmiljø er stabile. Andre er mere flygtige. Meget tyder på, at den tekniske kunnen har været høj, hvorimod købmandskab og økonomistyring har haft mindre gode kår inden for dele af miljøet". (Gelsing & Brændegaard 1990, p.44)

It is further explained, that a dynamic which seems to be functioning in the industry, is that when companies have suspended their payments, it has not had a huge impact on the industry, but merely been “ripples on the surface”, because the technological competences among the people in the companies, and the demand for such competences, have made it easy to create new companies, and as such the knowledge has not disappeared in the cases of closures in the region.

This is a very important passage in the report, because here, in the first publication dealing with what will become the NorCOM cluster, it is thus articulated that the telecommunications companies lack business competences and financial management competences, but this is not so important, because given the demand for the competences present, it has been relatively easy to create new companies and thereby maintain the valuable competences in the region.

As we shall see, the lack of business and financial competences continued to haunt the cluster for the following 22 years, until the disappearance of the NorCOM cluster, as it had been created through time, in 2009. We might therefore ask: How did this happen, why did nobody do anything to create such competences? The following analysis will illuminate that someone indeed tried to create such competences, but were not successful, and one of the main reasons for this were exactly the argument, articulated here, that technological competences were the core of the cluster. An argument, which as we shall see, became stronger and stronger over time, until a situation emerged where the lack of business competences and financial competences was seen as unimportant in the minds of most people in the cluster, and technology was articulated as the core of the cluster, leading to the situation and behaviour we saw in the TIDK case. And we might also note, returning to the TIDK case presented in the previous chapter, that this is the first sign, that apparently the focus on technology and lack of interest in business which we saw in this case, was not something special to the TIDK case, but instead a fundamental character of the companies in the NorCOM cluster.

Returning to the networks among the telecommunications companies (Gelsing & Brændegaard 1990) argue, that networks do not only exist among company managers but also further down in the hierarchy among what they call “technical key persons”, quote:

"We are also under the impression, that there are a number of technical key persons further down in the network's hierarchy who know of each other's “wanderings” in the industry, either because of personal conflicts or because of a company's up- and downturns. These

people can draw on each other's expertise in relation to specific technical problems, though more through calling each other than through trips to the pubs as in Silicon Valley"

"Vi har også fået det indtryk, at der findes en række tekniske nøglepersoner længere nede i dette netværks hierarki, som kender hinandens "vandringer" rundt omkring i miljøet, hvad enten det er sket på grund af personlige konflikter eller en virksomheds op- og nedture. Disse personer kan trække på hinandens ekspertise i forhold til specifikke tekniske problemer, mere ved hjælp af telefonen end ved værtshusbesøg som i "Silicon Valley"". (Gelsing & Brændegaard 1990, p.45)

They further argue, that it is probably not company secrets which are disclosed in this manner, but more knowledge of the type they describe as quote "then you can help me another time" knowledge, i.e. they help each other with the expectation of receiving help themselves in the future as a form of reciprocity. This practice in the cluster of people diffusing knowledge to each other between companies was what two other researchers from the business department at AAU, Michael Slavensky Dahl and Christian Richter Østergaard (formerly Pedersen) explored in detail in their publication (Dahl & Pedersen 2004). (Gelsing & Brændegaard 1990) also note in this regard, that there is evidence, in the form of a number of court cases, that there have also been more conflict-ridden examples, where people have used market oriented or development oriented knowledge owned by their former employer to start new companies, resulting in legal cases. Regarding the flow of people between companies (Gelsing & Brændegaard 1990) argue, that the two largest companies, Dancall and Cetelco, do not see this as a problem, because they receive around the same number of employees as they lose.

(Gelsing & Brændegaard 1990) makes the following attempt to summarize the telecommunications segment of the electronics industry in Northern Jutland:

"To try to summarize this part; it is apparent that a strong knowledge pool in the area of radio communication are becoming created in Northern Jutland. There are both engineers and other types of qualified work force in production as well as development. This is part of creating the foundation for an industrial development that can become self-perpetuating. There is about to be some examples that development takes place in Northern Jutland, Gorm Noris and T-COM, whereas the production takes place elsewhere in Denmark. Of course, this is not good for overall employment in Northern Jutland but it does show a certain technological strength"

"For at for forsøge at opsummere på denne del, så forekommer det klart, at der er ved at være skabt en rimeligt stærk videnspool i Nordjylland på radiokommunikationsområdet. Der er både ingeniører og andre typer af kvalificeret arbejdskraft i såvel produktion som udvikling. Det er med til at skabe grundlag for en industriel udvikling, som kan blive selvforstærkende. Der er ved at være nogle eksempler på, at udviklingen sker i Nordjylland, Gorm Niro og T-COM, hvorimod produktionen finder sted andetsteds i Danmark. Det er selvfølgelig ikke godt for den Nordjyske beskæftigelse generelt, men alligevel et tegn på en vis teknologisk styrke" (Gelsing & Brændegaard 1990, p.46)

The argument articulated by (Gelsing & Brændegaard 1990) is thus that the companies in the telecommunications cluster are tied together through business relations, as well as personal relations at both manager and engineer levels, through which knowledge flows, and the pressure from relative large companies outside the region has caused the emergence of a unity among the companies. The existence of a unity is also underscored in the use of the term "knowledge pool", in the quote above.

So (Gelsing & Brændegaard 1990) is the first publication to articulate the existence of a telecommunications industry with a special unity in Northern Jutland, with networks of key persons both at management level and at the technical level, a technological strength and a focus upon

technology, in the face of pressure from competitors outside the region. With regard to the future growth of the industry, (Gelsing & Brændegaard 1990) write the following:

“Continued growth and development in the electronics industry in Northern Jutland will depend on both craftsman/technical skills as well as business talent. But it is clear that both the developments in technology as well as changing markets create completely different conditions today than the ones that were present during the “founding period”.”

“En fortsat vækst og udvikling i den nordjyske elektronikindustri vil afhænge af både håndværksmæssig/teknisk kunnen og af godt købmændskab. Men det er klart, at såvel teknologi-udviklingen som ændrede markedsforhold sætter helt andre rammer i dag end dem, der fandtes i ”grundlæggerperioden”. (Gelsing & Brændegaard 1990, p.46)

In the conclusion of the report (Gelsing & Brændegaard 1990) argue that the background for the creation of the industrial milieu within telecommunications has been the knowledge networks in the region and therefore the key persons in the networks within the industry. Therefore, the creation process has been long, and the knowledge pool is tied to the region through the key persons, quote:

“It is apparent from the analysis of the development of the network, that the establishment of a pool of knowledge within a certain product area has been a prolonged process and the source can be traced back to the crucial choice of production strategy in SP-Radio in the beginning of the 1960s. Back then it was decided to focus on marine VHF and after about ten years there was a spin-off of companies with Dancom, Rauff & Sørensen, Dancall etc. There are in our data several things that indicate that the knowledge pool is relatively tied to the region. Partly because a number of the employees are ‘tied’ by family relations and housing but also because engineers and technical employees can exchange experiences more formally across company boundaries. This appears natural, since they may have been colleagues a few years prior in a different company. “

“Det fremgår af analysen af netværkets udvikling, at etableringen af denne pulje af viden indenfor et bestemt produktområde har været en langstrakt proces, hvis udspring kan føres tilbage til det afgørende valg af produktstrategi i virksomheden SP-Radio engang i begyndelsen af tresserne. Da valgte man at koncentrere sig om marine VHF, og efter ca 10 års drift begyndte virksomhedsknopskydningerne med Dancom, Rauff & Sørensen, Dancall etc. Der er i vores data flere ting, der tyder på, at denne videnspulje er relativt bundet til regionen. Dels er en række medarbejdere ”bundet” af familierelationer, bolig, men det viser sig også, at medarbejdere på ingeniør/teknikerniveau kan udveksle erfaringer mere formelt på tværs af virksomhedsgrænser. Det forekommer naturligt, da de måske for få år siden var kolleger i en anden virksomhed” (Gelsing & Brændegaard 1990, p.49)

(Gelsing & Brændegaard 1990) identified and articulated the telecommunications industry in Northern Jutland, as has been discussed in this section. The next step in the creation of what became the NorCOM cluster is to be found in (Dalum 1993), a scientific publication, which deals specifically with the telecommunications industry in Northern Jutland. But before moving on to look at this discussion, it is necessary to focus a bit more on the dynamics in the industry around 1990 to elaborate upon points made by (Gelsing & Brændegaard 1990).

8.3.2 Bringing the mobile phone to the world

Judging from interviews conducted with people who were part of the environment, the time around 1990 can in some regards be seen as the heyday of the telecommunications industry in the region. The 1980s were the time where Cetelco and Dancall grew big due to the NMT phones, which were relatively simple seen from a current technological perspective. Whereas development of a modern mobile phone in 2010 takes thousands of engineers, a group of 5 engineers could develop a NMT phone, as one manager recalled in an interview. Not only did Dancall and

Cetelco grew relatively big in the 1980s, seen in a Danish perspective, they were also in a situation around 1990, where they were competing directly with the largest players in the industry in relation to the development of the GSM phone, i.e. Nokia, Ericsson and Motorola. People in the industry therefore recalled the time around 1990 with DC Development, where both Cetelco and Dancall were owned locally, as the time where people in the wireless industry in the region stood together, through DC Development, and competed with the giants in the industry. One can say, story wise, it became a sort of David against Goliath, with the exception that David did not win in this case as I will come back to. This was in other words, the time where the people in the cluster were giving the mobile phone to the world. The engineers were proud to be among the first in the world to develop this technology and thereby among the people leading the way in this technological revolution.

In a discussion with Niels Buus, who was the chairman of NorCOM for a time in the 2000s he thus explained, that part of what gave the NorCOM association an understanding of being a unity, an “us” in relation to for example the IT industry in the region, as I shall return to later, was this phase, where the companies in the region were competing against the largest players in the industry, and bringing mobile phones to the masses:

“Well this was, this was the brain trust, this was, and I am not trying to be arrogant when I am saying this, this was the brain trust, where the biggest success was, this was where we were part of changing the world, we helped give the world mobile phones and we were some of the best in the field, etc. etc. right, And then it turned out we were a pulse beat, maybe two, or five, right”

“Jamen det var, det her det var jo hjerne trusten, det var, nu er det ikke hånligt jeg siger det, men bare sådan hjerne trusten, det var der hvor den største succes var, det var der hvor vi var en del af at ændre verden, vi har været med til at give verden mobiltelefoner og vi var nogle af de bedste på området, osv osv ikke. Og så viser det sig at man var et puls slag, eller to, eller fem, ikke.” (Buus 2010)

I shall return to the latter part of the quote, i.e. that it turned out that the cluster may have been just a few pulses in the industry, later. The important thing to note is, in line with the argument made by (Gelsing & Brændegaard 1990), that there is a unity in the industry, crossing company boundaries, due to the fact that the biggest companies in the region is cooperating at this time, in a struggle against the largest players in the industry, in a game, which is bringing mobile phones to the masses and thus changing the world. And the unity in this struggle to change the world in turn means that the people who are part of this, begins to see each other as a ‘we’, which is opposed to something from the outside. Drawing a link back to the theory chapter, we should here recall that it is only in the struggle against something that a species can exist as a unity, as a species.

The struggle for the GSM technology was in other words, what gave life and soul to the unity in the telecommunication industry in Northern Jutland, and gave people in the environment an ‘us’, an ‘us’ which were united in a struggle.

Buus’ quote above can of course in no way constitute a valid empirical argument for this emergence of an ‘us’ in the environment around DC Development, but what can, is the numerous empirical evidence which emerged from different sources during the next almost 20 years. In the following sections I will note when we see these proofs of the importance of DC Development in forming an ‘us’ among the people in the region. I will for example discuss how the outcomes of DC Development were constructed into a technological success in scientific works as well as newspaper articles in the following years, how it was worth copying, and how people in the environment indeed tried to copy DC Development in the early 2000s. I will for example also turn

to an important anecdote, which was articulated again and again, both in newspaper articles as well as in interviews; that Dancall could have become the next Nokia, and Nokia could have stayed a wellington factory. I will also turn to the continued discussions about making a new technology jump in the region from 2G to 3G which were ongoing for many years, and which all, generally seen, can be boiled down to a discussion of how the success of DC Development could be repeated. I therefore ask the reader to accept the argument that DC Development was the event which united the industry in relation to the self-understanding among the people in the industry, and in the following chapter I will show how this self-understanding as an 'us', which were founded on technology and cooperation, was strengthened over the years due to a number of different discourses emerging in different settings. Furthermore how this understanding of an 'us' founded on technology and cooperation in the end became, not only what characterized the behaviour in the majority of the companies in the cluster including TIDK, but which also became the reason why a number of trains were missed in the cluster, and therefore also partly what meant that the cluster disappeared fast in a time span of little more than one year in the late 2000s. One can also say, that at the time in the 1990s DC Development probably did not play the important role as the event which united the industry and gave rise to an 'us'. This role was constructed and ascribed to it in the following years, where people articulated stories about DC Development, where these stories were changed, and where they gave rise to new meaning in the interaction with other discourses emerging over the years. And it is this network of discourses, the emergence of the formation of discourses in which DC Development became the core event giving the NorCOM cluster, as it later became, its identity, or in other word, a self-understanding of being part of an 'us' in NorCOM among the people in NorCOM.

We should therefore turn to the next phase in the history of how the NorCOM cluster emerged, and this is the phase in the mid-1990s, where the concept of an industrial cluster was put on the agenda, and where the idea for a cluster organization emerged.

8.4 The mid 1990's and the emergence of the cluster

The unity and the cooperation were also seen at the micro level in these years among the smallest companies in the region, of which many were located at NOVI. Many of these had been started by people from Dancall or Cetelco, who therefore had relative large personal networks in the region, as discussed in (Dalum 1995). The spirit of the environment at NOVI was entrepreneurial in these years. People in these companies were helping each other, as one respondent who was part of the environment explained in an interview:

"... I have tried to be part of NOVI, also at the beginning, and you can say, that back then it was very much about, if somebody had a tool, for example a new research and development department, or something like that, then you could tell each other about it, and lend it to each other and show it, it was very entrepreneurial and I think you can find it a bit in the gaming environment. For example Uffe, he goes out and does lectures on the Android platform, the Apple platform etc, so you'll still see it, just in new environments, but not in the established areas, because, how to say it, there you are mature."

"...nu har jeg selv prøvet at være i NOVI også i starten der, og der kan man sige, dengang havde man jo meget det, at hvis en havde et værktøj, f.eks. et nyt udviklingsmiljø eller sådan et eller andet, så kunne man jo fortælle hinanden om det, og låne det til hinanden, og vise det, der var sådan en meget entreprenør, og jeg tror du kan finde det lidt i spilmiljøet. F.eks. Uffe han går jo også ud og holder mange foredrag omkring android platform Apple platform og sådan nogle ting, så du ser det jo, bare i nye miljøer, men ikke i de etablere miljøer, for der er det jo, skal vi sige, der er du jo moden." (Vestergaard 2010)

The reason why people in this environment were open, and helped each other, were according to Sven Vestergaard the DC Development story, which showed people that they were colleagues and not competitors, and that they could do something big, launch a technological revolution, as the legacy of DC Development was later framed as. And therefore after DC Development people in the environment not only saw each other as colleagues, they also knew one another from DC Development and they saw that they could lift each other by helping each other:

“Vestergaard:... it is very difficult to say what exactly there was in it. But it is perfectly clear that the fact, that it was possible to create a company together, as a development company, that was situated on the university campus, where there were two companies working together to create a development company, developing the GSM phone of the future, that was, well, something, that was really, the fact that it was possible to talk about something like that, that really shows, and confirms that from the industry’s side people considered each other colleagues and not competitors.

Reinau: So that is the DC development story there

Vestergaard: Yes, so what I really want to say is that, that was the one, it prepared the ground for people to consider themselves colleagues that could get together and discuss things, where after DC development came to an end, how employees were very well distributed. Some came to Støvring and others to Pandrup, right; it was all done very well. So you could really say, that a part of it was that, that Tordenskjold’s soldiers [Danish proverb: the same people over and over again] all knew each other and had an interest in, together, lifting each other up.”

“ Vestergaard: ... det er jo meget svært at eksakt sige hvad det er der har været i det. Men det var jo helt klart, at det, at man også kunne danne et fælles selskab som udviklings selskab, der kunne ligge på universitetet, hvor der var to virksomheder der egentlig var sammen om at have et udviklingsselskab, om at udvikle fremtidens GSM telefon, det var jo vel noget af det der egentlig, det at man i det hele taget kunne snakke om sådan noget, det viste jo egentlig, og bekræftede at man fra industriel side var kollegaer og ikke konkurrenter.

Reinau: Så det er DC development historien der

Vestergaard: Ja så jeg vil egentlig sige, at det er den, den gødede jo egentlig jorden for at man opfattede sig selv som kollegaer der kunne sætte sig sammen og drøfte nogle ting, hvor man jo også bagefter DC Development, den blev afsluttet, hvordan man jo egentlig meget fint fik fordelt de medarbejdere der var. Nogle kom til Støvring og nogle kom til Pandrup, ikke også, på en meget fin måde. Så man kan egentlig sige, det er vil meget det der egentlig er noget af det, at, at Tordenskjolds soldater kendte alle hinanden og var interesseret i, i fællesskab at løfte hinanden.” (Vestergaard 2010)

The unity stretched from the industry into the university, because with the links between the university which had educated a significant share of the engineers in the environment, the research done at the university which also found its way into the companies through cooperation, and the entrepreneurial environment at NOVI where people were helping each other, people saw the technological success of DC Development as a joint effort. DC Development was apparently understood as a united achievement by the wireless environment in Northern Jutland. This is also supported by the view from the current CEO of NOVI, Jesper Jespersen, who also saw DC Development as the event which tied the cluster together by proving that people in the industry could cooperate in the region:

“DC Development, right, that was it, when everyone came together and said, that there was something unique in the industry, and says none of us are big enough to develop the GSM phone on our own. Let us get together and together develop the basics, let us be able to in-

fluence ETSI standards etc. etc. And that was what they did, right og when we have godten that far, let us not go our separate ways. And then we take the base, which is shared, and then we built application and our own, what is it called, interface on top of it, etc. etc. I think that was a good idea. That was probably when NorCOM was born, when people says, can we use the knowledge we have gathered here. And from when the university was established, or rather it was already established, but NOVI was established in 89, and that was when people started to hold on to/get some of these things, I would imagine”

”DC Development, ikke, der var det vel, der gik man sammen og sagde, det var noget unikt i industrien, og siger vi er ikke store nok hver i sær til at udvikle GSM telefonen. Lad os nu gå sammen og udvikle basis i fællesskab, lad os få indflydelse på ETSI standarderne, osv osv, det var det de gjorde, ikke, og så når vi er nået dertil, så lad os skilles ikke. Og så går vi ud og tager basen, den er fælles, og så bygger vi applikationer, og vores eget, hvad hedder det, interface ovenpå, og så videre og så videre. Det tror jeg var en god ide. Det var vel i den tid NorCOM blev født, hvor man siger kan vi på tværs af det her, kan vi udnytte den viden vi nu har samlet. Og fra universitetet blev etableret, eller var jo etableret, men NOVI blev etableret i 89, og der begynder man jo ligesom at få fat i nogle af de ting, kunne jeg forestille mig.” (Jespersen 2010)

But how was this unification of the people in the industry possible one might ask? The empiric data suggest that this was possible because of the dense networks in the region. According to interviews there were a number of key persons in the environment, for example Annelise Rosenfalck at AAU, a successful fundraiser who initiated many important projects in the wireless environment at AAU. And Jørgen Bach Andersen, a researcher in the same environment who made a big effort to build bridges between the university and the industry and support the development (Vestergaard 2010), as well as a number of key people in the industry who knew each other from working together in the first companies in the industry. This thriving environment was also seen outside the region, and the presence of it was the reason why Sonofon decided to locate it offices in Aalborg in 1991, as Jepser Jepsersen, who were involved in the upstart of Sonofon:

”Well, that was, that was, if we think of the mobile industry, there was already a mobile industry in Northern Jutland and that could probably be part of the political decision to establish Sonofon up here. It was also, or established the headquarter up here, we did not know that when we got into this in 1991 in Sonofon, the autumn of 91, and back then we did not know if it should be Copenhagen, Århus or Aalborg, or what it was. But it became Aalborg because TDC already had its main headquarters in Copenhagen and Århus, right, and they already operated also Fyn’s telephon company, or whatever it was called. And we did not want headquarters right next to each other, two headquarters. So it became Aalborg, and I think that was a wise decision or rather it turned out to be a wise decision, we could not have known that but it turned out to be a wise decision in regards to recruiting employees, the types of employees we wanted, the type of engineers and computer engineers, etc, that we could draw from out here, right”

”Jamen det var jo, der var jo, hvis nu vi tænker på en mobilindustri, der var jo mobilindustrien i Nordjylland, og det kan vel være lidt af den politiske årsag til at Sonofon blev etableret heroppe. Det var jo også, eller etablerede hovedkontoret heroppe, det vidste vi jo ikke da vi gik ind i det her i 1991 i Sonofon, efteråret 91, og der viste man ikke om det skulle være København, Århus eller Aalborg eller hvad det var. Men det blev så Aalborg fordi TDC havde lokaliseret sit primært i København og Århus, ikke, men havde jo også opererede jo og Fyns telefonvæsen, eller hvad det hed. Men man ville ikke være op og ned af deres headquarter, to headquarters. Så det blev Aalborg, og det synes jeg var en klog beslutning, eller viste sig at blev en klog beslutning, det kunne vi jo ikke vide, men det viste sig at blive en klog beslutning med henblik på at skaffe medarbejdere, den type medarbejdere vi gerne ville have, og den type ingeniører og dataloger og hvad ved jeg, som vi kunne trække herudefra, ikke.” (Jespersen 2010)

In the industry a number of key people constituted a network at the manager level. And a detailed empirical source on this network exist today, because at the same time, in the early 1990s the interest in the cluster from the business department at AAU was also growing, and one researcher in particular stands out in this regard, Bent Dalum. Bent Dalum started studying the cluster in the early 1990s and though the years until his death in 2010, he played an increasingly important role as the person who, through his scientific work on the environment, as well as his work within the environment where he for example participated in all the meeting of the Nor-COM board, explained to people in the cluster what they were, and thereby gave them an increasingly elaborate understanding of why they constituted an 'us'. And it was also Bent Dalum who got the idea that the wireless environment constituted an industrial cluster. To understand this, let us look at two of his publications from 1993 and 1995, the 1993 publication is the first one to name the wireless environment in Northern Jutland a cluster.

8.4.1 An "Technology District" in radio communications in Northern Jutland

(Dalum 1993) is titled "North Jutland - A "Technology District" in Radiocommunications Technology?". In this report it is articulated, that the wireless industry in Northern Jutland can be understood as constituting a technology district, which (Dalum 1993) defines using Storper's contribution from the early 1990s, quote:

"In this light, the concept of Marshallian industrial district, while significant in its own right, needs additional specification if it is to distinguish those agglomerations which lie at the heart of advanced economic development today from other territorial collections of economic activity. To describe these agglomerations, as they are defined here, it might be more precise to refer to industrial districts based on PBT as technology districts" (Storper, 1991, p.40)" (Dalum 1993, p.171)

In a footnote to this definition, (Dalum 1993) notes that one example of a technology district is Silicon Valley. We here see a link to the earlier work by (Gelsing & Brændegaard 1990), in which it was argued that the telecommunications industry in Northern Jutland bore similarities to Silicon Valley. (Dalum 1993) thus continues the articulation of this resemblance, by articulating that the telecommunications industry can be conceptualized as a technology district like Silicon Valley. Further, and more explicitly regarding the link to the cluster discourse, (Dalum 1993) is also the first publication in which it is articulated that the telecommunications industry in Northern Jutland is indeed a cluster, in the Porterian sense, and this is done already in the introduction:

"... in the last one or two decades a "cluster" of internationally competitive firms, some among the world leaders in their area, mainly focused in different applications of radiocommunications technology (marine communications and mobile communications), has emerge. The employees are highly interrelated at the personal level, and there are many interfirm relations of cooperative as well as of competitive nature. In short, a "dynamic network" of firms in a high growth field appears to be present. Connected to this development has been a parallel establishment and growth of local knowledge institutions." (Dalum 1993, p.169)

It is described by (Dalum 1993) in relation to methodology of the study that it builds on a number of existing case studies of the Danish and Nordic electronics industries, amongst others (Gelsing & Brændegaard 1990). The theory forming the basis for (Dalum 1993) is a number of different lines of literature. The first is the national system of innovation literature of which a significant part emerged in the IKE research group at AAU, where Bent Dalum worked, especially the contributions by Bengt-Åke Lundvall. The second line of theory is Storper's discussion about "technology districts". The third line of literature is Porter's contributions on clusters. The forth line is the work in the IKE group on innovation and interfirm relationships. The methodology section in (Dalum 1993) contains a presentation and discussion of these four strains of literature, and along with these main strains several other contributions dealing with regions,

technology growth etc., are presented. The approach finally chosen as the basis for the empirical part of the report is Storper's approach, combined with insights from the other concepts. In the discussion about Porter's cluster concepts (Dalum 1993) argues that Porter's contribution has certain problems:

"... This, in our opinion, lack of consistency in aggregation principle raises problems about Porter's conclusions on the salient features of the economic development patterns of the ten nations analyzed. Another critical point is an unclear transmission mechanism from the importance of geographical proximity to the role of nations. However, Porter's extensive and, no doubt, influential work brings important conceptual and empirical insights to the analysis of the dynamic development of clusters of industries *especially in a regional context* and is for that reason highly useful in the context of the present project" (Dalum 1993p.175-176, Original Italics)

This has an important implication for how the telecommunication industry in the regions comes to be articulated as a cluster, because it means that in the introduction of the paper, the telecommunications industry in Northern Jutland is coined a cluster, but since Porter's theory is not chosen and utilized rigorously in the empirical part of the paper, but apparently merely used as a theoretical inspiration, it is never discussed why exactly the industry qualifies as a Porterian cluster.

Let us therefore have a look at the places in the text where Porter's contribution is used, to understand what underlies this use of the cluster concept in relation to the telecommunications industry in Northern Jutland. The first place in the empiric and analytical part of the report where Porter's terms are used, is in relation to the history of the industry, and the emergence of the industry:

"The foundation of SP radio in North Jutland after the Second World War does not appear to have a "theoretical" explanation. In Porter's diamond terminology (Figure 1) this was a chance event based on personal preferences" (Dalum 1993, p.188)

Porter's diamond model can be seen again in the discussion about why SP Radio changed focus from radio and television to professional maritime communications equipment, where (Dalum 1993) argues that this may have to do with local demand conditions, due to the harbours, the fishing fleet and the small to medium sized yachts in the region.

In the discussion about knowledge institutions in the region and the decision in 1972 by the Danish government to create Aalborg University in Aalborg, which opened in 1974, Porter's diamond model is not mentioned explicitly, but we see a clear implicit link to the focus in Porter's model in factor conditions, i.e. knowledge in the region, and impact of government, which is also a box in the extended diamond model, which is the one (Dalum 1993) presents on page 174 in the report.

(Dalum 1993) tells the history of the wireless industry in a lot of detail, discussing the background and focus of the largest companies, the impact of AAU and the impact of changing technology, for example the leap from 1G NMT technology to 2G GSM technology. After the history section in (Dalum 1993) a section follows which deals with what is called "recent developments". The argument is that data to the report was collected through interviews in the spring of 1992, but major changes in the industry occurred in the fall of 1992, and this section deals with these changes. The first one is that DC Development was closed down.

The small section in which the closure and legacy of DC Development is discussed is important for the following discourses which will, years later, form part of the foundation on which the whole NorCOM cluster with its history was founded. (Dalum 1993) tells the following:

“The DC Development technology was introduced, in four disguises, at the Cebit Fair in Hannover in March 1992 and became member of a small and exclusive club of firms, of which Motorola and Ericsson were the most prominent. Available evidence points at the DC Development technology as belonging to the world frontier. A knowledge asset, 30 young electronic engineers who had succeeded in launching a major technological innovation as *a team*, had emerged. However, the creation of this *highly critical asset* for the mobile communication industry in the region had strained the financial situation of the two mother firms to such an extent, that they lost their independence” (Dalum 1993p.196 Original Italics)

This paragraph contains arguments, which would become articulated again and again in the following years, and links back to what I discussed earlier, that DC Development became the event that united the industry. Firstly, the argument that the technology developed by DC Development was belonging to the world frontier. Secondly, that the outcome of DC Development was a knowledge asset in the form of a team of 30 engineers, with team underscored by italics. This team, as we shall see, is later transformed into the core of the cluster in the discourse in later publications mentioning DC Development, where it is argued that these people started new companies and lifted existing firms into the GSM era. Further, the focus on “team” is important, because in following publication DC Development is constructed discursively as the event, which showed that if people in the NorCOM cluster help each other, i.e. act like a team, then they can create world class technology.

Regarding the lost independence of Dancall and Cetelco, (Dalum 1993) moves on to discuss the situation of these two, and here we see how the entry of MNCs in the form of foreign ownership of Dancall and Cetelco causes difficulties in relation to cooperation in the region:

“DC Development was intended as a temporary venture and as such it has been a success. But due to Dancall’s and Cetelco’s connections to Philips and Hagenuk, respectively, it has not been possible to continue the arrangement. Philips Nürnberg and Hagenuk are direct competitors on the German market; and they are apparently not interested in further cooperation.” (Dalum 1993, p.196)

In a footnote to this it is elaborated:

“It is evident that the causes to the closure of DC Development is a controversial issue, because many outsiders have raised the question: why not preserve such a dynamic development asset as one unit. The present author has met several hypothesis during the project. The statement in the text above is the net result of the events; and does not intend to represent any value judgement.” (Dalum 1993, p.196)

Having discussed the closure of DC Development, which is presented in the text as a key event given the creation of a highly valuable knowledge asset, and argued that Dancall and Cetelco now plans to develop the next generation of the GSM technology independently, (Dalum 1993) turns focus to the future, and argues:

“One of the major issues for the future development of mobile communications in the region is, thus, whether it is possible to finance and create the necessary knowledge back-up to have two such teams running in the region” (Dalum 1993, p.197)

This is also important, because, here we see a small change in the discourse dealing with the future challenges of the cluster in regard to the earlier publication by (Gelsing & Brændegaard

1990). A small change which is so small that the reader barely notices it, but a change, which would have significant impact in the years to come. (Gelsing & Brændegaard 1990) made the point, as discussed earlier, that business and financial competences were lacking in the telecommunications industry in Northern Jutland, and that focus was placed upon technology. Therefore the future of the industry depended upon both good technical capabilities *and good business talent*. (Dalum 1993) changes this, so that the future is built on technology. By placing focus upon the technological side of the history in his account of the industry, and explicitly placing DC Development and the creation of a highly valuable knowledge asset as the centre of the industry, as the most important event in the industry, and arguing explicitly in the quote above that the future depends on the two development teams at Dancall and Cetelco, Dalum argues that technology is the key. Financial issues are only secondary, because they are necessary to support the development teams. The development teams, and thus the technology, is thereby articulated as the key to the future, as the heart of the cluster. Business talent, and the presence or lack of this, is not mentioned by (Dalum 1993) in relation to the future of the cluster. To put this in other words, (Dalum 1993) changes the discourse around the telecommunication industry, so now a positive future is dependent upon technology and creation of technological capabilities. And financial issues are important in so far as they are necessary to support development of technological capabilities. Business talent is not articulated as a key to the future, or as an important capability in the industry. The cluster thus becomes, as the title of (Dalum 1993) says, a technology district, where technology is the focus. And putting technology in focusing means that business talent is left out of the discourse.

Although the argument about a lack of business talent articulated by (Gelsing & Brændegaard 1990) is not repeated, we see in the discussion about the future of Dancall and Cetelco, and their entry into the German market through Hagenuk and Philips, that (Dalum 1993) mentions that limited marketing capacity in the two firms in relation to this market has previously been a issue:

“The DC Development equipment has started its entrance of the German GSM market during 1992, but it is too early to give quantitative estimates. But the lack of distribution channels and marketing capacity for Dancall and Cetelco on the German market has been an important feature.” (Dalum 1993, p.197)

After having presented the history and status of the industry (Dalum 1993) moves on to a section called “Characteristics of the regional system of innovation – a ‘technology District’?” (Dalum 1993, p.199). In this section it is analyzed meticulously, using the theory by Storper as a framework, whether the industry do qualify as a technology district. Storper’s theory is operationalized into a set of criteria, and (Dalum 1993) discusses whether the industry fulfils each of these. The first criterion is, quote, that “the competitive edge of the firms is based on continuous *product* development at the world technology frontier” (Dalum 1993p.199 Original Italics). Given the history presented about Dancall, Cetelco, DC Development and its GSM technology, which belongs to the world frontier, (Dalum 1993) concludes that this criterion is fulfilled.

(Dalum 1993) then notes, that this criteria neglect process technology, and he goes into a short discussion about supplementary assets. In this discussion he mentions, that the lack of scale has been a major problem for Dancall and Cetelco:

“According to this analogy economics of scale in production, and maybe even more so in distribution and marketing, are decisive factors in international competition; and the North Jutland firms (Dancall and Cetelco) have apparently lacked these factors during the 1980s and early 1990s. Thus, the lack of complementary assets (Teece, 1986) is evidently the major problem for these firms.” (Dalum 1993,p.199)

The second and third criteria are about whether there is significant export from the district and whether there are networks within the region. (Dalum 1993) concludes, on the basis of the description of the industry statistics earlier in the article, that the second criterion is fulfilled. Following a description of formal as well as informal network in the industry, using arguments similar to the ones presented by (Gelsing & Brændegaard 1990), (Dalum 1993) concludes:

“To conclude, the most important network “toolkit” of the system are informal personal contacts between the different actors. The third Storper criterion has, thus, a bias towards durability of formal network between firms, which to some extent is not fulfilled by this district. If this third criterion is reformulated to network relations between persons instead of firms it would apparently be fulfilled; the durability of the personal relations and the kind of mutual confidence they involve, is considered as decisive for a significant share of the technological dynamics of the district” (Dalum 1993p.200-201)

(Dalum 1993) thereafter argues, formal relations to actors outside the district and to other types of industries outside as well as inside the region may compensate for the lack of formal links among the communication companies in the district. He thereafter presents and discusses some example of such relations, and concludes:

“These cases indicates that the radio communications district apparently has reached a kind of *critical mass* capable of attracting network relations from firms outside the district as well as containing active partners in cross-industry interfirm networks inside North Jutland” (Dalum 1993, p.202 Original Italics)

(Dalum 1993) adds to this, that the presence of what he calls a “critical mass” is also illustrated by the emergence of a number of small development firms which develops radio technology for big firms outside the region, and thus functions as development houses, and he presents two of these cases, T-COM and BD-Consult.

The conclusion here can be read in two ways, one positive and one negative. The positive way, is that business relations inside the district are not so important, as long as people know each other and helps each other to develop new knowledge, because this new knowledge is the key behind the emergence of the new small development houses which live on R&D work conducted for larger companies located outside the district, as well as the key to survival for the larger companies in the district, refer to the earlier discussion about knowledge being articulated as the key to the future of the district by (Dalum 1993). One can however, also interpret it more negatively and argue, that the lack of business relations between companies in the district is a sign that the business talent needed to establish business relations were not present in the needed amount, and therefore the high amount of informal relations never gave rise to a significant amount of business relations in the region. I shall later return to this point, when I discuss the comments made by one of the chairmen of the NorCOM association, who argued later, that the organization never managed to move from discussing things to doing business together, which he saw as the real and necessary goal for a business association like the NorCOM association. Further, it can also be argued, that the fact that the new start-ups survive as development houses for larger companies outside the region, and thus are not complete companies, with R&D, Marketing, Sales, Production etc., but only development departments, shows that there are limited competences in other fields than R&D in these companies. (Dalum 1993) mentions in relation to formal relations going out of the district that, quote

“In general interfirm cooperation may either compensate for lack of complementary assets inside a field of technology, or may break ground in terms of the outcome of cooperation between firms from different industries” (Dalum 1993, p.201)

This means that according to (Dalum 1993) the lack of certain competences within the district can be compensated for by relations to actors possessing such competences outside the district. This is also one argument which we shall encounter later, because during the late 1990s and early 2000s, the acquisitions of R&D companies within the cluster by MNCs, as well as the creation of new MNC R&D subsidiaries within the cluster, led to the argument that business capabilities and marketing capabilities for example, were not important, because these functions were handled by the MNCs. This argument in (Dalum 1993) thus becomes part of the discourse, which turns the problem of a lack of business talent and financial talent articulated by (Gelsing & Brændegaard 1990) into a minor issue, since such capabilities can be sourced outside the region according to (Dalum 1993).

The fourth criterion is also fulfilled according to (Dalum 1993):

"The fourth criterion set up in Section 2 emphasized the sociological norms of economic life and incentives for product innovation, including the degree of prestige connected with entrepreneurial activity in the field. These factors have no doubt been important for the development of the radiocommunications industry in North Jutland." (Dalum 1993p.203 Original Italics)

This interestingly fits rather badly with the arguments articulated by (Gelsing & Brændegaard 1990) about the lack of business talent in the industry. (Dalum 1993) does indeed show that there is entrepreneurial activity in the region through his elaborate and detailed account of the different companies and their histories. However, he remains strikingly silent upon the issue, to which (Gelsing & Brændegaard 1990) is clear in their concluding chapters, that the companies lack business talent and financial capabilities. One should think, that lacking business talent is indeed an issue worth mentioning when the "sociological norms of economic life" is the focus. The lack of this discussion in relation to the fourth criteria thus support the point I made earlier, that the contribution by (Dalum 1993) to the discourse around the industry mainly is a strengthening of the focus upon technology as the key, and a deprecation of the issues surrounding a lack of business talent and financial capabilities.

The fifth criterion deals with the institutional structure and knowledge setup, and given the presence of AAU and NOVI this is also fulfilled according to (Dalum 1993), whom therefore concludes:

*"The conclusion is that it appears fruitful to consider North Jutland as a *technology district* in radiocommunications. As an *analytical device* the Storper discussion on technology districts as a special case of the Marshallian industrial district appears to be a useful road for further analysis." (Dalum 1993, p.204)*

In elaborating upon this, and the similarities and differences between the radio communications industry in North Jutland and Silicon Valley, (Dalum 1993) underscores that North Jutland is "certainly not a Silicon Valley-like district in its own right" (Dalum 1993, p.204), but there are similarities:

"... there are some features which may be comparable, such as the characteristics of knowledge exchange; university-industry links; and agglomeration of spin-off firms. Other features may be different such as the character of the capital market (lack of local venture capital)" (Dalum 1993, p.204)

In the discussions following this conclusion, we also find an important passage, which clearly shows that ideas and concepts from the scientific environment at AAU did indeed spread to the companies and influence these:

"It has been interesting to notice that most of the actors who have been interviewed found that the concept of a technology district, as it was presented to them at a previous stage of the work, intuitively corresponding to how they perceived the mechanisms at work in constituting some kind of synergy between the firms involved" (Dalum 1993, p.203).

He then goes on to agree, that only one company did not share this view:

"The only exception was SP Radio who has been able to maintain its lead during decades. Seen from the outside it is maybe not that surprising that the original mother firm for the whole district has another view of the interfirm relations. Spin-offs, just as divorces, often result in a certain amount of tension in mutual relationships – both kinds of events sometimes even have to be settled in court. It was on the other hand evident that the firm *hoped* that the region could be characterized as a technology district in the future." (Dalum 1993, p.204)

This is of paramount significance, because it shows how Bent Dalum and his colleagues not only planted ideas and concepts among the people they were studying, but also how these concepts started to influence the self-understanding of the people in the companies. Bent Dalum and his colleagues collected data from companies and institutions in the area to investigate whether a technology district were present, but in doing so, they also, as the quote above shows, planted the idea among the people interviewed, that they were part of a district. The quote shows, that the researchers through their work gave the people in the companies the concept of a technological district with certain characteristics, and that the people interviewed uses these concepts to re-interpret their situation and thus develop their self-understanding. In other words, the quote shows how Dalum by telling interview respondents about the concept, at the same time provided them with a concepts they could use to build their self-understanding, in this case something akin to - Oh yes, this makes sense, I am part of a technology district. The next step is, as is shown in the quote with the company disagreeing, that the researcher not only provided a concept which people in the industry could use to understand and frame their situation, the researcher also provided a concepts which in turn became a kind of guideline, used by people to understand what they should become. In this case the realization that SP Radio wished that the region would become a district.

Minutes from meetings in the 2000s in the NorCOM organization shows the same dynamics. In the minutes from a board meeting in NorCOM the 26th of October 2000, it is stated that Bent Dalum and Gert Villumsen from AAU through several years has delivered knowledge to the organization, for example an overview of the industry, as well as briefed journalists, which is an important point in relation to the future discussion of how the NorCOM cluster was turned into a success in the media in the last part of the 2000s:

"Bent Dalum and Gert Villumsen have for several years assisted the old NorCOM club with updated industry knowledge, contributions to the website, updating of corporate data, briefing of journalists and numerous other" NorCOM-external stakeholders, etc..etc. .. Bent and Gert have continued the work, as well as sustained the alert, and the participation after the formation of the NorCOM Association. The effort is in its entirety - and it can be organized and implemented in the future - described in the "knowledge package" and accompany these minutes.

The Board and Bent discussed the paper and the perspective and decided to accept the paper, so that Bent is responsible for the overall delivery.

In connection with the discussion, emphasis was placed on maximum visibility of the association's efforts - including ensuring that the website is constantly helpful and useful to members. Bent and Gert will help Mette Solskov with certain corrections in this regard. Among

other things, it be must ensure that the user of the website can get an overview of the entire "Wireless Communications Industry" without regard to whether the described companies are members of NorCOM. Lack of membership does still mean that there is no hyperlink to a non-member company"

"Bent Dalum og Gert Villumsen har gennem flere år bistået den gamle NorCOM klub med opdateret brancheviden, bidrag til hjemmeside, opdatering af virksomhedsdata, briefing af journalister og en lang række øvrige "NorCOM-eksterne interessenter, mv. mv.. Bent og Gert har fortsat arbejdet, samt opretholdt beredskabet og deltagelsen efter dannelsen af Foreningen NorCOM. Indsatsen er i sin helhed - og som den kan organiseres og gennemføres fremover - beskrevet i "videnpakke" og bilægges dette referat.

Bestyrelsen drøftede sammen med Bent oplægget og perspektivet og besluttede, at tiltræde oplægget, således, at Bent står for den samlede leverance.

I forbindelse med drøftelsen blev der lagt vægt på størst mulig synliggørelse af foreningens indsats - herunder at hjemmesiden konstant er nyttig og brugbar for medlemmerne. Bent og Gert hjælper Mette Solskov med visse rettelser i den forbindelse. Bl.a. skal det sikres, at man som bruger af hjemmesiden kan danne sig overblikket over den samlede "Wireless communication Industry" uden skelen til om de beskrevne virksomheder er medlemmer af NorCOM. Manglende medlemskab betyder dog stadig, at der ikke er noget link videre til en ikke-medlemsvirksomhed." (NorCOM 2000d, no page number)

Under eventually in the minutes from a later meeting it is described that Bent Dalum and Gert Villumsen from AAU as well as the minute taker has created a new part on the NorCOM website called "Cluster Overview" which contains a collection of the work the two researchers has done one the cluster, so that it is easily accessible for the users of the website (NorCOM 2000b). Further, Bent Dalum informed about, quote:

"... Companies that should be offered membership of NorCOM. In the near future these include: RFMD, ST Microelectronics, Mekoprint, TeleDenmark, PreTel and Polaris. It was decided to contact these by phone and arrange to send out membership and registration material)."

"... virksomheder der bør tilbydes medlemskab af NorCOM. Der er i nær fremtid tale om RFMD, ST Microelectronics, Mekoprint, TeleDanmark, PreTel og Polaris. Det blev besluttet, at kontakte disse telefonisk og aftale at der fremsendes medlems- og indmeldelsesmateriale." (NorCOM 2000b, no page number)

This shows clearly how Bent Dalum had a influence upon the discourse in the cluster by providing the members with the cluster concept and also suggesting which companies that should be part of this cluster.

The final three chapters of (Dalum 1993) is a chapter dealing with the future of the district, the role of policy and a post scriptum. The future of the district is mainly a discussion of the future of Cetelco and Dancall, the situation of Hagenuk in Germany, and a discussion of how the future might look for Dancall, in the case of different types of takeovers of the company. Bent Dalum here goes into the field we may call industry history. One could note, that Bent Dalum was fond of knowing the history and current situation of the companies in the region, and interested in their future, which his papers shows signs of, in as far as they often contain large parts which could be seen as industry history studies.

Looking at (Dalum 1993) discussion about the future of the cluster we find another important change of discourse compared to the one we saw in (Gelsing & Brændegaard 1990). (Dalum 1993) discusses the ownership situation of the companies in the cluster, whether they are stand

alone companies, as Dancall still is at this time, or owned by foreign companies, as is the case with Cetelco. He further discusses the pros and cons of foreign ownership:

"A tentative (normative) theory of a 'positive' take-over, seen from the point of view from the acquired firm, could be stated as: a "positive" buyer is a firm who needs a given asset as a complement to its stock of already existing assets. It is, thus, a necessary, through not sufficient, condition for the firm to be taken over that it contains assets not available for the buyer. The more so these assets are tacit and cumulative – i.e. difficult to formalize and transfer to outsiders – the stronger, potentially, the future position of the unit to be taken over." (Dalum 1993 p.206 Original Bold and Italics)

Having discussed the situations of Dancall and SP Radio, he concludes:

"The discussion of the future development perspectives for the three of the biggest firms in the district indicates that it is highly difficult – in any consistent sense actually impossible – to predict the implications for the district at large. What is presented has only the ambition to serve as guidelines for a more analytically based methodology for discussions of the future potential of the district. Part of this aim is to contribute to avoid either fatalistic conclusions about the negative consequences of foreign take-overs of local firms – or the opposite, i.e. purely naïve optimism when a strong international firm has made a local acquisition" (Dalum 1993, p.207)

These quotes illustrate a fundamental change in the way the future of the district is viewed by (Dalum 1993) compared to in (Gelsing & Brændegaard 1990). Where the latter saw the key to the future as a combination of technological skills and business talent, (Dalum 1993) sees the key to the future as a combination of technological skills and the right foreign buyers of these skills. Where (Gelsing & Brændegaard 1990) had a focus upon the companies in the district as "whole" companies, which therefore needed both technological skills as well as business talent to make a profit and survive, (Dalum 1993) sees the companies as technological development companies, and their future, in his perspective, depend upon whether they possess technologies and are acquired by foreign companies with specific complementary assets, so that a balance emerges where the development departments in the district thus become indispensable for the mother company. The change between (Gelsing & Brændegaard 1990) and (Dalum 1993) is thus a change between seeing the key to the future as whole companies with a business talent as well as technological capabilities, to a key to the future which is solely development of high quality technological competences, which can be sold to MNCs.

The change in focus made by (Dalum 1993) is logical seen from the situation in the cluster. The argument is, that given the changes in the mobile technology from 1G to GSM, the local players Dancall and Cetelco became too small to compete on their own. And what they have now, are competences which are valuable to larger players, therefore the future must depend on the continuous development of new competences. And it follows logically, that marketing competences and business competences becomes less of a concern, because these competences is what (Dalum 1993) calls complementary assets, possessed by the MNCs acquiring the firms in the cluster. Although (Dalum 1993)'s change of the discourse therefore seems perfectly logic, the situation in the cluster taken into account, we should remember Foucault's point, and also ask what the text does not say. One thing it does not say is why the future of telecommunications necessarily had to be mobile phones? There were a number of other fields where wireless technologies were applicable, and a market for it existed, outside mobile phones. As an example we can go back to the example of market areas the founders of ATL Research considered, as discussed in the previous chapters. In (Dalum 1993)'s writings, these areas are not mentioned, and focus is upon GSM technology, i.e. mobile phone technology. Seen in this light, the change in focus becomes less logical. One can argue, that in regard to niche markets and the possibilities of exploiting

these (Gelsing & Brændegaard 1990) had a point, because if some companies in the cluster were to go into niche markets in the wireless field, here understood as anything else wireless besides mobile phones, then they would need business talent and financial talent. By focusing solely on developing technology for mobile phones in the district, and disregarding the need for developing business talent, part of the basis for exploiting niche markets was thus lost. It seems that Bent Dalum realizes this towards the end of the report, because the final chapter of the report is a post scriptum, which begins:

“There is one field of technology which may have been given too little emphasis in the present study, cordless telephones (A “wireless appendix” to the wired telephone network).”
(Dalum 1993, p.208)

(Dalum 1993) thereafter deals with this technology, and the fact that Dancall has been investing in this technology, that a new European standard has been made for this technology, the so-called Digital European Cordless Telephony (DECT) standard by ETSI. A new venture is also underway in Northern Jutland, located at NOVI, Danish DECT Development, and several companies are involved in this project. Having thus touched upon a wireless technology, which is not mobile phones, Bent Dalum swings back to his main interest area, GSM and discusses the situation of Dancall in the final part of the post scriptum.

Thus, the situation is that although the existence of business areas outside mobile phones is discussed, it is not used as an argument for the necessity of focussing on the establishment of business competences in the district. One should note, that, as I shall come to later, some people in the cluster were arguing 17 years later, that the point where the discourses changed in the 1990s, so that emphasis was placed upon technology alone, and business competences were seen as less important, or not important at all, was also the point where the fate of the cluster was sealed. After this change, jobs and profits were no longer made within the cluster, but outside the cluster in MNC Headquarters, which also thereby had the power to decide which companies in the cluster should live or die, what competences that should be developed, and whether the cluster in Northern Jutland was to be the future centre for 3G development or die when the GSM knowledge were no longer valuable.

In the policy section (Dalum 1993) argues that policy matters to a degree, because, the efforts by the Danish government in creating AAU and the creation of NOVI have had what he calls “important implications for the industrial conditions of North Jutland in general, and especially for the emergence of a radiocommunications technology district” (Dalum 1993, p.207). (Dalum 1993) stays on the national level in the following discussion, and does therefore not deal with the idea of a cluster organization in this report.

To draw the line back to the question of how the industry became a cluster in this publication, we can say that the cluster concept entered the discussion because Porter’s contribution contained some insights, which Dalum found useful to understand the industry at hand. He does not go into a explicit discussion about whether the industry is indeed a cluster, but if one reads the passage on Porter’s theory, and knows his theory, then one can also conclude from the elaborate descriptions and discussions in (Dalum 1993), that the dynamics needed to classify something as a cluster seems to be present in the telecommunications industry in Northern Jutland. And therefore (Dalum 1993) emerges as the contribution which articulates the industry as a cluster. The statement that the wireless industry in the region constitutes a cluster becomes even stronger in the next contribution by Bent Dalum, emerging two years later, in 1995, let us know turn our focus to this.

8.4.2 An radiocommunication cluster in Northern Jutland

(Dalum 1995) takes it as a fact, that a cluster within radio communication does exist, as can be seen from the following quote from the introduction in the paper:

"The present paper takes as its point of departure this dilemma between advantages and disadvantages of a dynamic network of small high tech firms. The case to be analysed is a 'cluster' of highly international electronics firms and their relations to knowledge institutions in the region of North Jutland in Denmark. The cluster of firms under study, of which some are among the world leaders in their area, are mainly focused on two different applications of radiocommunications technology, i) marine communications and ii) mobile and cordless communications. The employees are highly interrelated at the personal level and there are many interfirm relations of cooperative as well as of competitive nature." (Dalum 1995,p.3)

It is stated later in the article, that it is Porter's definition of a cluster which is used in the paper, in line with the contribution in (Dalum 1993). The paper then moves on to discuss the characteristics of the Danish electronics industry, in general, number of employees, experts etc., the global radio communications industry, and then finally focus is turn to the North Jutland region. The discussion of the so-called cluster begins with a short introduction of the actors:

"The most important actors - defined as firms, individual entrepreneurs and knowledge institutions - related to the radiocommunications industry in North Jutland are shown in Figure 2. The historical evolution of the cluster of firms is shown in terms of spin-offs and personal links between some of the main entrepreneurs. Representatives from a major share part of this innovation system was interviewed by the present author during an EU funded Monitor/FAST project in 1992 (see Dalum 1993). Table 2 contains data based on these interviews, many of which have been updated caused by major changes in size and/or ownership structure. Most of the firms are in one way or another spin-offs from SP Radio, and have been established on the basis of a cumulated competence in marine radiocommunications. This plays an essential role for the fact that many of the key-persons from the firms know each other personally." (Dalum 1995, p.11)

The article then moves on to a section called "The Radiocommunications industry in Northern Jutland". The first sub section is called "History", and in this, the history of the cluster is presented, and the story told is similar to the story told in (Dalum 1993). The following subsection is called "Recent Developments". Also in these sections we see a description which comes close to industry history. Dalum accounts meticulously for the development of the industry in the region, and the story is up to date, which means that now the sale of Dancall to Amstrad is included in the story. The story does as such not change or add significantly to the already existing discourse, which emerged with (Dalum 1993), and which put technology at the centre of the cluster. The only place where it adds something is in relation to the nature of the cluster, where (Dalum 1995) notes in relation to the situation of Dancall:

"Dancall has grown from a position of around 200 employees after restart in late 1993 to a present level around 550; and a major invest programme has been publicly announced. Amstrad has apparently decided to pursue a strategy of becoming a mass producing firm in mobile and cordless phones - i.e. to reach such levels of production that the firm will become a major European player. This most recent development represents, thus, an entirely different path compared to Cetelco. Apparently - and rather surprisingly, an economy-of-scale producer is emerging in the North Jutland region." (Dalum 1995, p.16)

It seems, that the sections describing the NorCOM cluster draws heavily on (Dalum 1993). In the following section "Some main characteristics of the North Jutland system of innovation", the link to (Dalum 1993) is drawn again. It is repeated that the industry in the region qualifies to be called a "technology district", and the characteristics of this is presented again; the informal

networks, the global linkages within the telecommunications industry, the local linkages to other industries. The discussion then goes into the same discussion we saw in (Dalum 1993) about a “(normative) theory of a ‘positive’ takeover” (Dalum 1995, p.21), and a chapter on the role of policy, similar to the one found in (Dalum 1993).

The contribution of (Dalum 1995) to the discourses around the telecommunications industry thus becomes to place the term “cluster” in the title of the contribution, and thereby articulate, through a publication in an international journal, that the telecommunications industry in Northern Jutland indeed constitutes a cluster. The story told about the industry in the region is, to a large extent, the same story as was told in (Dalum 1993) but more up to date, and with a different theoretical focus, although the empirical part of the publication and the discussion is very similar. That it is (Dalum 1995) which receives attention is shown by the fact that it is cited by 70 other publications according to Google Scholar the 23rd of November 2010, whereas (Dalum 1993) is only cited by 11 according to Google Scholar the 23rd of November 2010.

Status by 1995 is thus that three scientific publications have dealt with the telecommunications industry in Northern Jutland in detail. The first of these, (Gelsing & Brændegaard 1990) identified and articulated the existence of a telecommunications industry with a special unity in Northern Jutland, with networks of key persons both at the management level and at the technical level, a technological strength and a focus upon technology, in the face of pressure from competitors outside the region. The future, according to this publication, depended upon technological competences as well as business talent and financial competences. The second publication (Dalum 1993) added the technology district to the discourse, and as a secondary concept the cluster concept to the discourse around the industry. Further, the publication changed the discourse so that the key to the future became technology alone. (Dalum 1995) further underscores the cluster concept in the discourse, by moving this to the title of the publication.

Further, as discussed in relation to (Dalum 1993) these three publications have not only investigated the companies in the region, and helped construct a discourse that articulates that these together constitute a cluster. They have also impacted the way in which the people in the companies understand themselves. We saw that it made sense for people interviewed to understand themselves as being part of a technological district. The next important step in the construction of the NorCOM cluster is that the dynamic environment existing among the companies buys into an idea emerging in the business department at AAU, which is that it will be useful to create a cluster association. The point here is not, that it was the researcher that created the cluster, they simply planted an idea which many persons in different organizations and institutions in the region subscribed to, because of their different strategies and goals. It is therefore time to turn focus to the birth of the NorCOM cluster, which is the phase in the middle of the 1990s where the discourse about the wireless industry in Northern Jutland constituting a industrial cluster in accordance with the theories of Michael Porter, is fused into the entrepreneurial environment existing in the industry at the time. This is taken up by the people in the environment, who in turn starts arguing, that they are a cluster, which in turn strengthens the already present self-understanding of an ‘us’ in the industry.

8.4.3 The NorCOM club is created

The event, which marked the birth of the NorCOM cluster, as it was to become known around the world, was at a seminar held at Hotel Hvide Hus in Aalborg in august 1995. At this event Bent Dalum presented some of his scientific work on the cluster, and among the people present at the seminar were the CEO of NOVI as well as other representatives from NOVI, two people from Spar Nord and a number of people from the industry, in other words, key people from the wireless environment in Northern Jutland.

At this seminar Bent Dalum argued, that the industry constituted a cluster, and that he believed that a cluster organisation should be established. This point was well received, and a group of people afterwards took on the work of promoting this idea; these were Knud Rindum, CEO of NOVI, Sven Valentin and Bent Dalum, himself, from AAU.

There proved to be widespread support for the idea of a cluster association, and there were, according to interviews with key people and written sources, three rationales for forming the club. One was visibility and promotion of the companies in the cluster worldwide. Some of the companies were relatively small companies, which did not possess the capabilities or the resources to do promotion activities on a global scale, and by creating a club it would be possible to join forces and the companies could thereby support each other in relation to promotion. The second was to support knowledge diffusion among the companies. This could be done in several ways, for example through creation of courses and presentations for the members, or through the establishment of a database for course organizers, as the first chairman of NorCOM explained in an interview, when asked about rationales for starting the association:

“... another element was that we should try to, we wanted through [the founding of the association] to try to hire some lecturers that could come and tell us about different things that would be beneficial to all of us in some ways. A third element was probably to try to, well, that was there from the beginning too, to try and cooperate about courses, at least we spent some time at one point, on trying to create a sort of experience database with course providers, as there were definitely dirt and cinnamon [Danish proverb meaning good and bad] amongst the course providers back then, just like today. And then we might as well exchange experiences. And say, these are good, if you need to know something about this or that area, because to some extent we all worked on the same things. Well, it was all mobile communication in many different forms, but do you need to have a guy participate in a course on some kind of programming then it does not matter if you are doing one, or another or a third mobile gizmo, that is actually competing with somebody else, it is the same course the guy needs. So there were many elements to it, how could we help each other run our business to the greater good of the individual company but also the area as a whole. I think the last part, well it sounds very nice to say you are doing something for the area's sake, you are not, that is crap, basically, it is crap, you are doing it for your own company. Because it is about filthy lucre. Companies need to make money, the end. The concept of Corporate Social Responsibility had not been invented back then, but it was still there. Consequently, we wanted to do something, do something for the area, we wanted to foster and help each other, to make the area work.”

“...Et andet element var at vi skulle prøve at, vi ville så derigennem [Skabelse af foreningen] prøve at hyre nogle foredragsholdere, til at komme og fortælle lidt forskelligt, som vi alle sammen kunne have glæde af på en eller anden måde. Et tredje element var vel, at vi forsøgte jo også, ja det har nok også været inde fra starten af, det med at kunne arbejde sammen om kurser, vi brugt i hvert fald noget tid på i en periode, at se om vi kunne få lavet sådan en form for en erfaringsdatabase med kursusholdere, fordi der var jo skidt og kanel imellem hinanden af kursusholdere, det var der også dengang ligesom der er i dag. Og så kan man jo lige så godt bytte erfaring. Og sige dem der, de er dygtige, hvis man nu skal vide noget indenfor et eller andet område, fordi et eller andet sted arbejdede vi jo sådan lidt med de samme ting. Altså det var jo mobil kommunikation i mange forskellige afskygninger af det, men skal man have en mand på kursus i en eller anden programmeringsteknologi, så er det altså ligegyldigt om man laver det ene eller det andet, eller det tredje mobildims, som i virkeligheden konkurrerer med hinanden, det er det samme kursus manden skal af sted på. Så der var sådan flere elementer af det altså, hvor vi kunne hjælpe hinanden med at drive vores virksomheder, til gavn og glæde for selvfølgelig den enkelte virksomhed, men også for området som helhed. Jeg tror nok det sidste, altså det er jo, det lyder jo så pænt at sige at man gør det for området skyld, det gør man jo ikke, det er noget vrøvl, dybest set er det noget vrøvl, man gør

det for sig egen virksomheds skyld. Fordi det handler om ussel mammon. Virksomheden skal tjene penge, slut. Begrebet corporate social responsibility var jo ikke opfundet dengang, men det var det jo alligevel. Altså vi ville jo et eller andet, og gør et eller andet for området, og dyrke hinanden og hjælpe hinanden med at få området til at fungere." (Gjerrild 2010)

A third reason, which also emerged in the interviews, was the accelerating engineering wages in the region. These rising wages meant that some business leaders welcomed a forum, where they could discuss the situation, and hopefully curb the rises, which were according to some damaging to the companies. This reason was, due to Danish law, not articulated in news articles, but nevertheless an issue which according to some persons was one of the reasons why there, from the very beginning, was a wish among participants to keep the association a private industry lead venture, and thus a private club, without control or interference from the county or local municipalities.

The idea gained momentum in the following years, and when the NorCOM club was created two years later in 1997 it was without a general assembly, because all companies agreed that it was positive for the industry if such a club could create awareness and promote the companies. Some of the key people in the club, for example Bent Dalum, got media coverage from the newspaper *Ingeniøren* in relation to the launch of the new business club, and the deal was, that *Ingeniøren* was going to cover the cluster in a series of articles published in the latter part of 1997. And in the process leading to these articles Bent Dalum came up with the name NorCOM. These articles, according to Bent Dalum, also played a key role in relation to gaining further support for the future initiatives in the NorCOM association, because the companies saw that the articles in *Ingeniøren* raised awareness about the industry, and therefore they supported the initiatives put forward by the NorCOM association.

One can also say, in this regard, that the father of the NorCOM cluster is Bent Dalum. He was the person who brought the cluster concept into the scientific discourse around the telecommunication industry in Northern Jutland. He also managed to spread the concept among the key persons in the networks in the industry, and it was him who articulated the idea of creating a cluster association and came up with the name NorCOM.

Let us now move on, and analyse how the association NorCOM became what it was, and whether the dynamics we saw in the TIDK case were a symptom of this, or in other words, whether the discourses around the NorCOM association can help us to understand the dynamics we saw in the TIDK story, and if these dynamics were found in other companies in the cluster too. To do this I will utilize two different sources of empiric data. One is newspaper articles and scientific articles dealing with the NorCOM cluster, the other is interviews and communication with key people who were part of the environment. Let us first look at how the environment was articulated in the media.

8.5 The late 1990s: The creation of an success of fairytale proportions in the media

The first article in *Ingeniøren* on the 8th of august 1997 about the newly established cluster association has the heading "Business club hunting for synergy" (*Industriklub på jagt efter synergi*) (Thomsen 1997a). The club consists of 18 companies plus NOVI and AAU, according to the article, in which it is explained, that the companies from North Jutland entered the world market together through the Internet. The presentation window to the world is a web site:

"...35 screen pages filled with a long series of updated data in English about the companies involved, the presentation of the entire technical environment in Northern Jutland, the historical development etc. It has become the mobile industry in Northern Jutland's exhibition window to the world"

"... 35 skærmsider er fyldt med en lang række engelsksprogede opdaterede data på de involverede virksomheder, præsentationen af hele det nordjyske tekniske miljø, den historiske udvikling mv. Det er blevet til den nordjyske mobilindustri's præsentationsvindue mod verden." (Thomsen 1997a)

The article also explains what an industrial cluster is, and it is argued that NorCOM is a cluster, and the inspiration comes, as it can be seen, from Porter's definition:

"A cluster is a cluster of companies that work within the same technical field. The common aspect is the technical, which means that a cluster does not necessarily consists of a complex of cooperating companies. It may very well be competitors. A knowledge based cluster consists of universities, institutes etc. as well as companies. NorCOM is such a cluster."

"Et cluster er en klynge virksomheder, som arbejder indenfor samme tekniske felt. Det fælles er teknikken, hvilket betyder, at et cluster ikke nødvendigvis behøver at bestå af et samarbejdende kompleks af virksomheder. Det kan meget vel være konkurrenter. Et videnbaseret cluster omfatter foruden virksomheder også universiteter, institutter mv. NorCOM er et sådant cluster." (Thomsen 1997a)

In line with the discourse around technology presented by Bent Dalum in his scientific publication in 1993 and 1995, he articulates, in this article, that innovation, and thus technology is the key to success:

"for the team of Dalum and Rindum, there is no doubt: innovation and more innovation is the way forward to ensure the survival of the companies."

"For makkerparret Dalum og Rindum er der ingen tvivl: Innovation og atter innovation er vejen til virksomhedernes overlevelse" (Thomsen 1997a)

Interestingly in the elaboration of this in the article, we see that it is not only technological knowledge which is the focus; it is also marketing knowledge, which emerges in the following passage, where the article discusses the rationales behind forming the club:

"We realised that the companies rarely met to exchange experiences, evaluate developments in the market, or to take stock of the technological developments. We have now made that possible, says the CEO Knud Rindum, Novi A/S Research Park and Development Company, who together with associated professor Bent Dalum from Aalborg University, have created a network across the companies"

"Vi fandt ud af, at virksomhederne kun i ringe omfang mødtes for at udveksle erfaringer, vurdere markedsudviklinger, og ikke mindst for at tage bestik af den teknologiske udvikling. Det har vi nu givet dem mulighed for, siger administrerende direktør Knud Rindum, Novi A/S Forskerpark og Udviklingsselskab, som sammen med lektor Bent Dalum, AAU, har skabt et netværk på tværs af virksomhederne." (Thomsen 1997a)

We see in this quote, that the two persons; Bent Dalum and Knud Rindum, are articulated as the persons who identified the lack of network and who have now given the companies a place to meet and exchange knowledge. This places the two persons, discursively, in a place where they become the knowing experts, looking at the industry from the outside, i.e. from the university, studying it, in the case of Bent Dalum, and helping new companies, in the case of Knud Rindum from NOVI. This again places the researcher, Bent Dalum, in a position, where he through his position as a researcher, is able to tell people in the industry what they need to do; in this case exchange more knowledge, as well as to explain to the public that the wireless industry in Northern Jutland constitutes a cluster. This also links to the previous discussion around the publication (Dalum 1993), in which we saw evidence, that the ideas planted by Bent Dalum gave rise to reflections among the business people he was studying, and affected their self-understanding,

so that they after being presented with the concept of a technological district wanted the area to become such a technological district. In this case the researcher goes out in the media, in Ingeniøren, and says that people need to communicate more. The idea of promoting knowledge diffusion reaches inside the participating companies, and one objective of the association is also to build networks between development-, production- and marketing departments in the companies, and AAUs technological research and business research, as well as to enhance communication within the companies:

"In some of the larger companies, I have realized that in the day to day work the companies' development and marketing departments can be very far from each other and also in that context the association has shown its worth, says Knud Rindum"

"I nogle af de større virksomheder har jeg erfaret, at der i det daglige kan være meget stor afstand mellem virksomhedernes udvikling og marketing, så også i denne sammenhæng har klubben vist sin berettigelse, siger Knud Rindum" (Thomsen 1997a)

"We are convinced that NorCOM helps further communication internally between the companies, as well as between the companies and the knowledge institutions in the region. That leads to synergy and it simultaneously helps the companies to remain competitive. "

Vi er overbeviste om, at NorCOM fremmer kommunikationen internt mellem virksomhederne selv og mellem virksomhederne og regionens vidensinstitutioner. Det fører til synergieffekt og er samtidig vigtige elementer i virksomhedernes kamp for fortsat at være konkurrencedygtige" (Thomsen 1997a)

Even the MNCs see a need for more knowledge diffusion according to the article.

"The need for the mobile competitors in Northern Jutland to talk more to each other is clearly present. As a concrete example, George Bregnhøj mentions that both Maxon as well as one of its competitors both separately - but from a single supplier - have ordered the same auxiliary equipment for a new mobile phone. - It is foolish to spend resources on development that both sides know that a competitor is also working on, but that actually happens today. Both companies can save resources by collaborating on such a case, says Jørgen Bregnhøj. "

"Behovet for at de nordjyske mobilkonkurrenter taler mere sammen er klart til stede. Som konkret eksempel nævner Jørgen Bregnhøj, at såvel Maxon som en af virksomhedens konkurrenter begge hver for sig - men hos en og samme underleverandør - har bestilt samme hjælpeudstyr til en ny mobiltelefon. - Det er tåbeligt at bruge ressourcer på en udvikling, som begge parter ved, at en konkurrent også er i gang med, men det sker faktisk i dag. Begge virksomheder kan spare ressourcer ved at samarbejde om en sådan en sag, siger Jørgen Bregnhøj." (Thomsen 1997a)

The article also explains why competitors in the cluster are able to participate in the club:

"When competing companies are able to be in the same room, it is because all of them can get something out of it. For the small companies, and there are most of these, it means something to be able to reference the cluster they are part of, for example by using the overview online. At an internal telcom fair in Singapore, a small development company from Northern Jutland does not seem like much but the network that the company is a part of and which can be displayed on a screen that increases credibility"

"Når konkurrerende virksomheder meget vel kan sidde i stue sammen, skyldes det også, at de alle sammen får noget ud af det. For de små virksomheder, som der er flest af, betyder det noget at kunne referere til det cluster, de er en del af, f.eks. ved hjælp af oversigten på Internettet. På en international telekommesse i Singapore syner et lille nordjysk udviklingsfirma ikke meget, men det netværk, virksomheden nyder godt af, og som kan trækkes frem på skærmen, øger troværdigheden." (Thomsen 1997a)

We might wonder why the message from Bent Dalum and Knud Rindum is that the companies only to a limited extent exchange knowledge, because in Bent Dalum's scientific work on the cluster in the early and mid 1990s he underscores the presence and importance of informal networks among people in the cluster, through which knowledge was spread. He actually went as far as to argue that these informal relations were intensive, and were what was knitting the cluster together. Take for example the following quote from (Dalum 1995):

"There are, though, relatively few examples of formalised interfirm cooperation. (of which DC Development was a major example). But the *informal* personal networks, as stressed originally by Gelsing & Braendgaard (1987), have been very important. Below the level of top management there are intensive interpersonal links between employees, even from firms who are competitors. This is further emphasized by the existence of a common labour market for electronic engineers at the one end and assembly workers at the other. Because the region is fairly small there has been a high degree of flexibility and mobility on the labour market; a substantial amount of people have been employed in more than one of the radiocommunications firms. The most important mechanism in knitting the system together are informal personal contacts between the different actors." (Dalum 1995, p.18)

We can come closer to a rational for this difference between what is articulated in the scientific articles and what is articulated in this newspaper article, if we recall that this article in *Ingeniøren*, and the following in the series dealing with NorCOM, was created to a large extent by key people in the NorCOM cluster. According to Bent Dalum, the series of articles gave people in the cluster the opportunity to write the history of the NorCOM cluster in the media, and it seems that Bent Dalum and other key people in the cluster have had a significant influence on the stories told in these articles, and used it to their own advantage. In this light the content of the series of articles seems rational, the first articles is the window in which Bent Dalum promotes his research and AAU's business research, and the importance of this, by articulating that he has identified a lack of knowledge diffusion as something which limits the companies in the cluster, and Knud Rindum promotes NOVI's role and importance as the science park which is able to support knowledge exchange between the companies. One can say, therefore, that this article represents the voices of AAU and NOVI articulating what a cluster is, arguing that NorCOM is a cluster and explaining why AAU and NOVI are important in the environment.

The second article in the series of *Ingeniøren* articles the 17th of October 1997, which deals with the NorCOM cluster, focuses on the success of the cluster, i.e. the growth of the cluster. (Thomsen 1997c) thus publishes an article with the heading "Teleboom in Northern Jutland" (Nordjysk Teleboom), and in this it is argued:

"Whether a unique north jutlandish gen for entrepreneurship and development exists amongst electronics engineers from Aalborg University is unknown. But it is a fact, that electronics companies especially in telecom in Northern Jutland are busy; partly with developing and expanding and partly with spin-off, where typically engineers are leaving good jobs to try their luck as entrepreneurs"

"Om det er et helt særligt nordjysk gen for iværksætteri og udvikling hos elektronikingeniørerne fra Aalborg Universitet vides ikke. Men det er en kendsgerning, at elektronikvirksomheder især indenfor teleindustrien i Nordjylland har travlt: Dels med at udvikle og udvide, dels med knuskydning, hvor typisk ingeniører bryder op fra gode stillinger for at prøve lykken som virksomhedsejere." (Thomsen 1997c)

A number of stories about growth in this so-called booming environment are mentioned in the article, and the data forming the basis for the article is a survey carried out by the NorCOM organization itself. This time the person cited in the article is Jørgen Basballe, who is the secretary in the NorCOM association. It is stressed in the article, (Thomsen 1997c), that it is not only spe-

cific companies which are growing, but that the growth is very clear among the 18 members of NorCOM. These companies represent between 1700 and 1800 workplaces in the region, and none of the 18 companies has decreased their number of workers, few have had no growth, and by far the most have experienced growth, according to Jørgen Basballe. According to him, the total amount of people working in electronic companies in Northern Jutland is around 4000.

Of companies mentioned in the article is Dancall Telecom A/S in Pandrup, employing 650 people. In this company the development department has grown with 30 employees during the last year and reached 140 people, of whom 100 are engineers, and future growth is expected according to the article. Further, the company has just been acquired by Bosch, which, quote

"... now is in the process of making Dancall the corporation's competence centre for GSM. For this purpose Dancall has just started building a factory of 25,000 square meters in Pandrup"

"... nu er i færd med at gøre Dancall til koncernens kompetencecenter for GSM. Til dette formål har Dancall netop påbegyndt et fabriksbyggeri i Pandrup på 25.000 kvadratmeter" (Thomsen 1997c).

Sonofon in Aalborg is also mentioned, this company is a service provider, and is as such also part of the industry. It has 500 employees in Aalborg and 800 in Denmark in total, including 60 engineers, and has had a growth rate of one employee a day during the last year (Thomsen 1997c). Maxon is mentioned as a medium sized company with around 100 employees, and this company has grown 45% in the previous 18 months. Another company in this class, RTX Research A/S has, according to the article, had 4 years of growth, and expect to pass 50 employees by the end of the year. The article also argues that growth is occurring among the small companies and as a point in case ATL Research is presented. This company employs around 10 people, of whom 8 are engineers, and expect a doubling of the workforce within the next three quarters (Thomsen 1997c). The second article thereby becomes the one, which promotes the companies in the cluster and their growth rates.

The third article in the series of articles in Ingeniøren, on the 24th of October, which deals with the NorCOM cluster, focuses on the work areas of the cluster, and focus is thereby moved from the growth figures of the companies to what they are actually working with. (Thomsen 1997b) uses the heading "North Jutland electronics is more than mobile phones" (Nordjysk elektronik er mere end mobiltelefoner). The point in this article is that it was mobile phones which made Northern Jutland known within the electronic industry, but companies in the region are also producing modems, speakers, PCBs and equipment for patient surveillance. What unifies the companies is, according to the article, radio communication and navigation:

"The largest electronics companies in Northern Jutland, concentrated in Aalborg, Pandrup and Støvring, have one thing in common: they are engaged in radio communication and navigation"

"De største nordjyske elektronikvirksomheder koncentreret i Aalborg, Pandrup og Støvring har én ting til fælles: De er beskæftiget med radiokommunikation og navigation" (Thomsen 1997b)

What this article does is to unite the companies and rearticulate the story of the cluster to emphasize that it is indeed a cluster. Firstly the article proclaims that what unites the companies is that they are working with "radio communication and navigation". It is thus not IT companies or software companies, only companies working with radio communications and navigation that are part of the unity. And then it is underscored again, that the spin-off process occurring among these companies is special:

“And it is engineers from these companies that have shown remarkable flair for founding new companies. T-Com A/S, established by a group of seven engineers from Dancall a few years ago, is a textbook example of this.”

“Og det er ingeniører fra disse virksomheder, der har udvist en bemærkelsesværdig tæft for at skabe nye virksomheder. T-Com A/S etableret af syv ingeniørbrydere fra Dancall for en halv snes år siden er et skoleeksempel herpå” (Thomsen 1997b)

Again we have a discourse, not only telling what unifies the companies in the NorCOM cluster, i.e. the focus upon communication and navigation, but also an article that repeats that the engineers are special in that they have shown a “remarkable” ability to create new companies. In other words, it states that the engineers within the cluster is both a unity and special.

After having presented some examples of companies and their status, the article tells the story of how the cluster began with the section headed “It began with SP”, referring to SP Radio. The section also explains, with reference to the first article in the series in *Ingeniøren*, that the NorCOM association is a business club or an ERFA group, a Danish term for a group where professionals can share experiences, and that the group was started due to an initiative by Knud Rindum and Bent Dalum to expand the cooperation among companies in the cluster. The section also gives some examples of member firms, for example Dancall and ATL Research. In the discussion the article also underscores what distinguishes firms within NorCOM and firms outside for example in the IT industry, and interestingly, this is apparently not only the work area, but also the network and the history of the firms, as is shown in the section with the heading “More under the umbrella”:

“In addition to the grouping of high-tech companies in radio and navigation, the region also has electronics and software companies as well as companies in industrial control, medico-technical equipment as well as the graphics industry that can be characterized as part of the electronics industry. On the one hand they are part of the overarching industrial umbrella of electronics in Northern Jutland, but on the other hand they have not emerged from the radio and navigation companies. And as such they are not part of the spin-off from SP. Amongst some of the subcontractors, several of the companies are established as off-shoots but from another parent company – Mekoprint A/S.”

“Foruden grupperingen af high tech-virksomhederne indenfor radio og navigation eksisterer der i landsdelen også elektronik/software-virksomheder samt selskaber indenfor bl.a. industriering, medikoteknisk udstyr og den grafiske branche, som kan betegnes som elektronikindustri. De falder på den ene side nok ind under brancheparaplyen nordjysk elektronik, men har på den anden side ikke rod i radio/navigationsvirksomhederne. Og er som sådan ikke en del af den knopskydning, der er udgået fra SP. I underleverandørbranchen er flere virksomheder alligevel etableret gennem knopskydning men her fra et andet moderfirma – Mekoprint A/S.” (Thomsen 1997b)

So we have here a second delineation when it comes to defining what member firms of NorCOM are. One is the work area dimension, as mentioned earlier, i.e. the work area has to be within radio communication or navigation. The second dimension is, according to this, what we can call heritage, i.e. the firms have to have historical links to SP Radio or the other early companies within the cluster originating from SP Radio, say Dancall or Cetelco. This is important in relation to the self-understanding among engineers and managers within the NorCOM cluster, because this shows that it is not enough to come as a outsider to the region and do work within radio communication or navigation. The heritage to the large companies which form the backbone of the cluster in the accounts which were discussed earlier such as (Dalum 1993) and (Dalum 1995) has to be in place too, before the membership of the special unity is in place. It is thus a

cluster joint not only through a joint work area, but also through a joint history, a joint heritage. And we shall later see how this heritage influenced the self-understanding, when we come to the track record discussion, after 2000. By then the story had become among many people in the cluster, that business competences were not important, since the track-record of the cluster showed that the way forward was to start small R&D companies, which would be acquired by MNCs, turning the founders into millionaires. One can say that the heritage dimension adds to the personal relationship in this story, people in the companies were not just part of R&D companies within a cluster working with radio communication and navigation, they were part of a cluster, and had a special heritage, and that made them special.

The forth article in the series in *Ingeniøren* dealing with NorCOM has the heading "Portrait of a wanted engineer" (Portræt af en eftertragtet ingeniør) the 21st of November 1997 (Thomsen 1997d). In this article the focus is especially on the engineers wanted by the companies in NorCOM, and the articles reports the findings from a master thesis in geography written at University of Copenhagen:

"The thesis that will complete Henrik Skarsø's M.Sc. in geography from the Department of Geography, has as its main aim to examine the framework conditions for the developments in the electronics industry in Northern Jutland: what are the underlying reasons for the notable and successful position of radio communication in today's industrial landscape in Northern Jutland? He is examining their education, mobility etc, so that he can discuss the influence of the engineers on the success of the electronics industry in Northern Jutland. Also the role of the University of Aalborg will be a subject of analysis in the thesis."

"Specialet, der skal bringe Henrik Skarsø's naturvidenskabelige kandidateksamen i hus fra Geografisk Institut, har som hovedsigte at se nærmere på rammebetingelserne for udviklingen indenfor nordjysk elektronik: hvad ligger til grund for den markante og succesrige position, som radiokommunikation indtager i det nordjyske industrilandskab i dag? Han undersøger deres udannelse, mobilitet etc., så han på denne baggrund kan diskutere ingeniørernes indflydelse på elektronikbranchens succes i det nordjyske. Også Aalborgs Universitets rolle bliver genstand for behandling i specialet." (Thomsen 1997d)

And the main result is that the wanted engineer is, quote:

"He is young – around 32 years old. He has typically been in the industry for no more than four years and has often had other jobs than his current one. He has a strong network amongst his engineering colleagues – also the ones working for the competitors and he cares more about the work than his salary"

"Han er ung – cirka 32 år. Han har typisk været i branchen i højst fire år og har ofte haft andre job end sit nuværende. Han har et stærkt netværk med sine ingeniørkolleger – også dem i konkurrerende virksomheder, og så prioriterer han sine arbejdsopgaver højere end lønnen" (Thomsen 1997d)

This engineer, with less than four years of experience is, as simple math shows, not the engineer who has been part of the industry since the beginning, with a track record at Dancall or Cetelco in the 1980s etc. Instead he has entered the cluster during the early 1990s. This means, that the average engineers, who this article profiles, is different from the older engineers who had been working at SP

Radio, Dancall etc. He does not have the heritage that these engineers, who we may call the old NorCOM engineers, have. Therefore the articulation that these young engineers constitute an important part of the explanation for the success of the cluster is important discursively, because it links to the earlier statements made in the previous articles. By making this statement this article builds a discursive relation between four discursive statements. The first is that the

cluster emerged with the SP children, as we saw in (Gelsing & Brændegaard 1990). The second is that the key dynamics behind the cluster is the informal networks between a number of key persons in the cluster, both at manager level as well as engineer level, who know each other and have worked together in some of the first companies, as articulated in (Dalum 1993) and (Dalum 1995). This is in other words the old engineers. The third argument is that what unifies the companies in the cluster are both the joint work area, and the joint heritage to the old companies, as articulated earlier in the series in *Ingeniøren*, and as such the heritage of the old engineers. And the fourth argument linked to these three is the one found in this article which links all the younger engineers to the success story. It argues that it is the young engineers, working in these companies, companies which implicitly have the heritage and some employees which are part of the important network in the cluster and companies which have links back to SP Radio. As such, the young engineers become part of the cluster, of the heritage in the cluster, and, this is the key, of the 'us' that exists among people in the cluster, who share the history and can trace their heritage back to SP Radio. In other words, the 'us' in the NorCOM cluster is created in the articles through the story they articulate. But that this story is articulated does not automatically make it the prevailing story. This occurs in the following years, and is a consequence of a number of different dynamics coming together.

One of these dynamics is the discourse about synergy which gains further momentum in the following years, thereby tying the people in the club together, and we shall see in the following sections how this 'us' is intensified because of a number of different events.

Let us for now stay with the issue of how the NorCOM cluster became a success story. Another article in *Ingeniøren* on the 13th of February 1998 (Thomsen 1998d), thus reports the findings of a questionnaire, the newspaper has sent to the 18 companies in NorCOM. The result is that 12 of the 18 companies in the association have answered the survey regarding their expectations of the future. If weighted by their turnover 90% of the companies expected more work put out to their suppliers, which implicitly means that the expectation is that more business relations to suppliers will be created. The prospects of an increased amount of linkages within the cluster is also articulated in another article in *Ingeniøren* on the 13th of Marts 1998, (Thomsen 1998a), which reports that Center for PersonKommunikation (CPK) will be moved physically from AAU to NOVI on the 16th of April the same year. The statement made in the article is "Knocking a hole in the academic wall" (*Der blev slået hul i den akademiske mur*), and it is expected that this will cause synergy, quote:

"That means that CPK lands in an environment that is bursting with development activities – no wonder that NOVI's management expects that mutual influence will trigger synergy."

"Det betyder, at CPK lander i et miljø, der ligefrem strutter af udviklingsaktivitet – intet under, at NOVI's ledelse venter, at den gensidige påvirkning vil udløse synergieffekt" (Thomsen 1998a, p.8).

The message articulated is, that by moving CPK to where many of the small start-up companies are also localized, information will be spread between the research environment at CPK and the more entrepreneurial companies, for example in the shared canteen, as one of the professors at CPK argues in the article:

"- there is clearly symbolic value in the bridge between NOVI 2 and the University, says Professor, dr techn. Jørgen Bach Andersen, who leads Center for PersonKommunikation. Besides the symbol-ism of this bridge between the university and the knowledge park, which is now being realized, the new lease will inevitably mean that the academic research environment and the more fast-paced here-and-now development environment of the companies will inspire each other. - One should not underestimate, for example, the small-talk and exchange

of viewpoint that will inevitably happen between researchers and development people when they meet informally over lunch in the new communal cantina, says Jørgen Bach Andersen”

”- Der er en klar symbolværdi i broen mellem NOVI 2 og universitetet, siger professor, dr.techn. Jørgen Bach Andersen, som leder Center for PersonKommunikation. Foruden det symbolske i denne slåen bro mellem universitetet og vidensparken, som nu realiseres, medfører det nye lejemål uundgåeligt, at det akademiske forskningsmiljø og virksomhedernes mere kontakte her-og-nu-udviklingsmiljø vil befrugte hinanden. – Man skal eksempelvis ikke undervurdere den small talk og udveksling af synspunkter, der uvægerligt finder sted under uformelle former, når forskere og udviklingsfolk i fremtiden mødes i en fælles kantine, siger Jørgen Bach Andersen.” (Thomsen 1998a, p.8)

The next statement we encounter is that the companies in the cluster are dominated by foreign capital, which is the message on the 8th of May in an article in *Ingeniøren*. (Thomsen 1998c) thus reports that 8 of the 19 companies in NorCOM, around 41%, are completely owned by foreign capital. Seen in relation to workers, 82% of the workers in the cluster are employed in those 8 companies, 1458 persons out of 1787 in total. This statement supports the argument we saw earlier, that the unity of telecom companies in NorCOM possesses what we may call special competences, or that they are special, in this case, it is stated that they have a special ability which is why they have caught the attention of foreign companies, but exactly what this special ability is, is not disclosed. It is only disclosed that the same tendency is seen at country level in Denmark to a lesser extent, whereby the article proclaims that the companies in NorCOM are special compared to the companies in the rest of Denmark, but not why this is the case:

”In Northern Jutland, the vast majority of jobs in the electronics industry are foreign owned. Nationally, it is about fifty-fifty. The regional concentration of the Danish electronics industry in Aalborg and north of here has particularly caught the attention of foreign investors.”

”I Nordjylland er langt størstedelen af arbejdspladserne i elektronikindustrien på udenlandske hænder. På landsplan er det snarere fifty-fifty. Den regionale koncentration af dansk elektronikindustri i Aalborgområdet og nord herfor har i udpræget grad udenlandske investorer opmærksomhed” (Thomsen 1998c, p.2)

”In Northern Jutland foreign dominance has been growing since the 1990s and associate professor Bent Dalum from University of Aalborg as well as CEO Christian Buhl from the trade association Elektronikindustrien agree that the same trend - although less pronounced - is visible in the whole electronics industry”

”I det nordjyske har den udenlandske dominans været voksende op gennem 1990’erne, og såvel lektor Bent Dalum fra Aalborg universitet som direktør Christian Buhl fra brancheforeningen Elektronikindustrien mener begge, at den samme tendens - om end mindre udtalt - afspejler sig i den samlede elektronikbranche” (Thomsen 1998c, p.2)

The argument that the companies in NorCOM are special, which is reflected by their growth rates, is re-articulated in even sharper terms in *Berlingske Tidende* the 16th of august (Stougaard 1998). Under the heading ”Good ideas become the electronics of the future on the drawing board in Northern Jutland” (Gode ideer bliver til fremtidens elektronik på tegnebrættet i Nordjylland), or it is argued:

”In Northern Jutland the high-tech companies lie side by side, and other industries can only dream of their growth. Companies often double the number of employees from one year to the next, and the biggest problem is attracting enough qualified employees. The advent of mobile phones in Denmark and the rest of the world is the element which more than anything else drives growth. The phones need to be smaller, better and more advanced - and that demands constant developments. A Danish version of Silicon Valley is there for emerg-

ing. The cooperation between electronics companies in Northern Jutland is called NorCOM and includes almost 25 companies with more than 3000-4000 employees. “

“I Nordjylland ligger de højteknologiske virksomheder tæt, og væksten kan man kun drømme om i andre brancher. Virksomhederne fordobler ofte antallet af ansatte fra år til år, og det største problem er at skaffe tilstrækkeligt med kvalificerede medarbejdere. Mobiltelefonernes indtog i Danmark og resten af verden er det element, som mere end noget andet driver væksten. Telefonerne skal være mindre, bedre og mere avancerede – og det kræver konstant udvikling. En dansk udgave af den californiske Silicon Valley er derfor ved at skyde frem. Det Nordjyske samarbejde mellem elektronikvirksomhederne hedder NorCOM og omfatter knap 25 virksomheder med over 3.000-4.000 ansatte.” (Stougaard 1998, p.1)

We find two interesting arguments in this. The first is the re-articulation of the statement, which we saw emerged in (Dalum 1993), which is that technology is the focus. The demand for mobile phones means that “constant development” work is necessary – the article does for example not say anything about the marketing competences which are needed to navigate this new and booming market. The second argument is partly a re-articulation of the comparison between Silicon Valley and NorCOM and partly a change of this statement. We saw in the scientific publications discussed earlier that from a scientific viewpoint some dynamics in NorCOM was comparable to those found in Silicon Valley, whereas there were clear differences in relation to other dynamics, for example the lack of size as discussed by (Gelsing & Brændegaard 1990) as well as the lack of local venture capital as argued by (Dalum 1993). These differences are not mentioned, instead NorCOM is simply a Danish version of Silicon Valley, and interestingly, the notion of a lack of size is reversed, because in the way the issue is framed in this article, NorCOM is not articulated as being too small to be comparable to Silicon Valley, instead Denmark with its labour market is articulated as being too small for the NorCOM cluster, which at the same time is called “Mobilicom Valley” which clearly is a way to emphasize the argument that NorCOM and Silicon Valley are similar:

“But for Mobilicom Valley in Northern Jutland Denmark is already becoming too small. Several companies have given up on attracting sufficient numbers of Danish applicants for future growth periods. Therefore they look increasingly abroad when planning strategies and future growth periods.”

“Men for den nordjyske Mobilicom Valley er Danmark allerede ved at blive for lille. Flere af virksomhederne har opgivet at få tilstrækkelig med danske ansøgere til de kommende vækstperioder. Derfor kikker de mere og mere på udlandet, når der skal udtænkes strategier og lægges planer for vækstperioder” (Stougaard 1998, p.1)

We see here, that through this articulation the problems facing the companies in the NorCOM cluster, in this case, the lack of workers, is articulated as something external to the cluster. It is Denmark, which is too small. This might seem as a small and irrelevant point, but it is actually an important point, which we will also see emerge later, in relation to a lack of venture capital. We saw earlier that there is a lack of venture capital in the NorCOM cluster, as articulated by (Dalum 1993), but as we shall see, this is also articulated in the media as a problem with Denmark, and as such articulated as a problem residing outside the cluster. And this is important in relation to the discourse about an ‘us’ in the cluster, because this tendency of locating and articulating problematic issues as something external makes it possible to retain the notion of a successful ‘us’ inside the cluster, even though this ‘us’ is facing several problems. In other words, some of the problems facing people in companies in the cluster, for example a lack of venture capital, are articulated as a problem external to the cluster, and as such the ‘us’ within the cluster is not to blame for the problem.

The success statement is articulated again approximately three months later, under the heading "Here the mobile phones of the future is developed" (Her udvikles fremtidens mobiltelefon) in *Ingeniøren* the 13th of November (Thomsen 1998e):

"They are not resting on their laurels in Mobilicom Valley – read: Northern Jutland – where electronics companies are known as dynamic development environments for anything that has to do with mobile communications. University of Aalborg has initiated a three year collaboration with five electronics companies in Northern Jutland about UMTS (universal Mobile Telecommunications System) which is the next generation of mobile communication."

"De hviler ikke på laurbærrene i Mobilicom Valley – læs: Nordjylland – hvor elektronikvirksomheder er kendt som et dynamisk udviklingsmiljø for alt, hvad der har med mobilkommunikation at gøre. Aalborg universitet har indledt et treårigt samarbejde med fem elektronikvirksomheder i det nordjyske om UMTS (Universal Mobile Telecommunications System), som er den næste generation inden for mobilkommunikation" (Thomsen 1998e, p.13)

The success statement is further strengthened in *Jyllands-Posten* the 3rd of May, (Larsen 1999), with the heading "Nokia occupies Northern Jutland" (Nokia indtager Nordjylland):

"With Nokia's establishment in Aalborg, Northern Jutland is starting to mark itself as a knowledge centre and powerhouse for mobile communication"

"Med Nokias etablering i Aalborg er Nordjylland ved at markere sig som videns- og kraftcenter for mobilkommunikation" (Larsen 1999, p.7)

"We chose Aalborg because it is a powerhouse for mobile communication and we wanted to be part of that powerhouse" says software developer Alan Jacobsen, who will be team leader at the new center in Aalborg. High-tech Nokia employs 600 people in Copenhagen and expects to hire 20-30 people in Aalborg. "The Aalborg section will primarily employ engineers and computer engineers, who will develop the high-tech software of the future for GSM. Research like that demands a highly skilled workforce, which is available in this specific area. This is because the University of Aalborg in the past 10 years has established itself as one of the best educational institutions in Northern Europe in the telecom area," says CEO for Nokia Denmark, Birger Jürs."

"Vi har valgt Aalborg, fordi det er et kraftcenter for mobilkommunikation, og det kraftcenter vil vi være en del af," siger softwareudvikler Alan Jacobsen, som skal være gruppeleder på det nye center i Aalborg. Højteknologiske folk Nokia beskæftiger 600 mennesker i København og regner med at ansætte 20-30 mænd i Aalborg. "Aalborg-afdelingen vil primært beskæftige ingeniører og dataloger, der skal udvikle fremtidens højteknologiske software til GSM. En sådan forskning kræver en højt kvalificeret arbejdskraft, som netop er tilgængelig i dette område. Det skyldes, at Aalborg Universitet de seneste år har etableret sig som en af Nordeuropas bedste uddannelsesinstitutioner indenfor telekommunikation," siger administrerende direktør for Nokia Danmark, Birger Jürs." (Larsen 1999, p.7)

The article further adds to the statement about the signalling value of NorCOM. The chairman for the NorCOM association, Svend Valentin is quoted in the article:

"A mobile communications cluster without Nokia is not be complete. It has great signaling effect that they are coming here. Along with other companies, it shows that it is possible to create knowledge-based companies in Northern Jutland" says Sven Valentin, who is the chairman of NorCOM"

"En industriklynge indenfor mobilkommunikation uden Nokia er ikke helt fuldendt. Det har stor signalværdi, at de kommer her. Sammen med de andre virksomheder viser det, at det kan lade sig gøre at skabe vidensbaserede virksomheder i Nordjylland," siger Sven Valentin, der er formand for NorCOM." (Larsen 1999, p.7)

The article further shows, that a clear focus in the NorCOM association is on attracting MNCs to the region, to promote the region, and make it possible to attract employees:

""We are working consciously to attract the big ones, because the stronger the grouping is, the easier it becomes to attract the highly educated from outside. They want to come up here because there are many companies at a high technological stage. And the large international companies often look at where in the world people with these skills are, and they place their development centers there," says Sven Valentin."

""Vi arbejder bevidst på at få de store herop, for jo stærkere denne gruppering er, jo lettere har vi ved at tiltrække højtuddannede udefra. De vil gerne komme herop, fordi der er mange virksomheder på et højt teknologisk stade. Og de store internationale virksomheder kigger ofte på, hvor i verden, der er folk, der kan det her, og placerer de deres udviklingscentre der," siger Sven Valentin" (Larsen 1999, p.7)

So we have the statements that the companies in "Mobilicom Valley" are successful, are experiencing growth, which other industries can only dream about, and are attracting attention from foreign MNCs. This is also utilized by the NorCOM association, as discussed earlier, promotion issues was one of the reasons why NorCOM was founded, and here we see that a strategy is to attract the large MNCs to the region to make it more visible.

The focus on attracting the attention of foreign MNCs is also shown in an article emerging approximately four months later, on the 30th of September, in the same newspaper, with the title "the Japanese are courting electronics in Northern Jutland" (Japanerne sværmer om nordjysk elektronik) (Nordhagen 1999c). This article reported that a delegation consisting of eight CEOs and researchers from Yokosuka Research Park, representing amongst other Fujitsu, NTT, DoCoMo and Panasonic, had visited Aalborg. During the visit they had had meetings with people from Novi, AAU and NorCOM. Among local companies the delegation visited RTX Telecom and ATL Research. RTX Telecom, it is noted, in the article, was awarded the prize "Growth creator of the year" (Årets Vækstskaber) in the region in 1998, and ATL Research has just been acquired by Texas Instruments. The article further tells that Novi has planned to construct another 300 square meters of officespace, compared to the 16.000 square meters the science park already possesses. According to the CEO of Novi, Jesper Jespersen, it is hoped that some of this new space will be used by Japanese companies. However, at the moment, only one such company is present, Sanyo, with only one employee. The article rounds up, with a discussion of the status of the NorCOM cluster, and according to the article, the cluster is only topped in Europe by similar environments in Munich and London. Another piece of news is that Ericsson is opening a second site in the cluster:

"The industrial cluster is first and foremost placed at Bosch Telecom Denmark, with 1700 employees in Pandrup. But only a week ago, Ericsson made public the establishment of department number two in Aalborg with around 60 employees, who will be part of the development of the newest standards in mobile telephony, UMTS, Universal Mobile Terrestrial System. This standard is expected to replace GSM and all other systems worldwide, and that is why the Japanese are also interested in UMTS"

"Den industrielle tyngde ligger først og fremmest hos Bosch Telecom Danmark med 1700 ansatte i Pandrup. Men det er også kun en uge siden, at Ericsson offentliggjorde etableringen af nummer to afdeling i Aalborg med omkring 60 medarbejdere, der skal være med til at udvikle den nyeste standard indenfor mobiltelefoni, UMTS, Universal Mobile Terrestrial System. Denne standard ventes at erstatte GSM og alle andre standarder på verdensplan, og derfor har UMTS også japanernes interesse." (Nordhagen 1999c, p.2)

8.6 The last phase of the NorCOM association's history

The analysis of how the NorCOM club was promoted in the media in the previous chapter showed how the club was firstly articulated in a series of articles in *Ingeniøren*, where a number of arguments were made, and if we are to gather these arguments in a number of bullet points, four themes emerge from the four articles:

- The importance of research in the cluster at AAU and company support at NOVI
- The high growth of the companies in the club, and thus the success of these
- The unity of the companies in the club created through joint work areas and joint heritage
- The importance of the engineers in this unity

We also saw how, in the following articles, some of these themes were rearticulated, for example the success of the companies, the synergy between AAU and the industry in relation to the localization of CPK at NOVI, and the similarity to Silicon Valley, i.e. the Mobilicom Valley discussion. The media coverage also illuminates a new issue, and this is the inflow of MNCs, which is important if we are to understand the dynamics occurring within the NorCOM club.

One of the reasons why the club was formed was to promote the companies through a joint effort, and in this we also find the rationality for the series of articles in *Ingeniøren*; they each promoted a different aspect of the cluster in a successful perspective. I will argue, that although the articles were made as delivery work, and promotion, they also helped kick-start a discourse which continued to gather momentum in the media, namely that of a successful cluster focusing on technology and engineering work, as the presentation of the newspaper articles in the previous chapter showed.

In the media, a distinction was also made, with the emergence of this discourse in the late 1990s between the successful NorCOM companies focusing on R&D, engineering work, and wireless communication and navigation and then another branch of the environment, which was the full companies with production lines, i.e. Dancall and Cetelco, the original companies in the cluster. The reader might ask; how this is possible, for Dancall is mentioned above as being part of the NorCOM cluster? This is possible because in the discourses a distinction was made between wireless R&D work, and production work, i.e. companies producing whole products, so that through the late 90s and early 00s, NorCOM would become an R&D cluster, which had important implication for the view of business and marketing competences.

From the establishment of the NorCOM association in 1997 and until the bubble burst in 2000, the companies in the NorCOM cluster experienced growth, a number of new companies were started, and a number of MNCs came into the cluster, and discursively the cluster became articulated as a success of fairytale proportions in the media, as the previous section showed.

This growth, and the success discourse meant, that some people in the club stated arguing that if the NorCOM association should keep track with the development, and be able to make a difference in the future also, then it needed to have more power, and this could be achieved by formalizing the club and adding a budget, because this would make the club able to carry the challenges posed by the growth and thus the new situation in the region (Hedevang 2010). Hedevang thus explained:

"Hedevang: Give it more power. I mean, get the industry marked more clearly through a more powerful organization.

Reinau: Power in relation to what

Hedevang: More professional organization both along internal lines, to mark and do something, so it strengthened the network and cooperation across the companies, there was definitely a mission statement to strengthen cross-cooperation networks businesswise and professionally from every angle, by strengthening the organization, and by becoming more visible and powerful externally. As a kind of trade organization in Northern Jutland, for that particular part of industry, nothing to do with DI (Danish Industry) nothing to do with any of the established (organizations). It was completely independent, without being in opposition to anything, that was not the case. It was simply a logical outgrowth of the situation and then the organization thought of it. And then says, well, we have the concept of network, we have Porter [reference to Michael Porters theory] and we have Bent who has already described and done by, about the advent of this industry. Because he had already done that."

"Hedevang: Give det mere power. Altså få industrien markeret noget tydeligere gennem en mere slagkraftig organisation.

Reinau: Power i forhold til hvad så

Hedevang: Mere professionel organisation både egentlig på de indre linier, at markere og gøre noget, så det styrker netværket og samarbejdet på kryds og tværs, der var et helt klart idegrundlag om at det ville styrke det tværgående samarbejdsnetværk forretningsmæssigt fagligt, på alle leder og kanter, ved at styrke organiseringen, og at man også blev mere synlig og slagkraftig udadtil. Som en art nordjysk brancheorganisation, for den del af industrien, ikke noget med DI, ikke noget med nogen af de etablerede. Altså det var en helt selvstændig, uden at det var tænkt i modsætning til noget som helst, det var det ikke. Det var bare simpelthen en logisk vokse ud af situationen og så tænke organisation på det. Og så sige, jamen vi har netværksbegrebet, vi har Porter og vi har jo Bent der allerede har beskrevet og gjort ved, på den her industris opkomst. Det havde han jo allerede gjort der." (Hedevang 2010)

Hedevang explained further, that with the formalization, the nature of the club changed from an ERFA group to a trade association, and he also argued that he saw this change as the most important in the history of NorCOM:

"... I would say the most important change was the change from a club to an organized association, professionalized with, what should we say, with meetings, and sessions, and there was an economy. The rest that was really just adjustments successively in that model. And the adjustments to, what should we say, that, all the technological changes that happened, and all the structural changes that happens, who owned the industry, and how were new companies created etc. So NorCOM itself, the association's model, organizational, I do not think that was really changed. It was adjusted along the way and there was a new strategy paper passed in 3 or so."

"... jeg vil sige den vigtigste ændring det var at gå fra klub til organiseret forening, professionaliseret med hvad skal vi sige, med møder og rækker og, altså, der blev sat økonomi på. Altså resten, det var egentlig tilpasninger, successivt indenfor den model. Og tilpasninger til hvad skal vi sige, den, alle de mange teknologiske ting der skete, og alle de strukturforandringer der skete, hvor at, hvem ejer industrien, og hvordan dannes der nu nye virksomheder og så videre. Så selve NorCOM modellen foreningens, organisationsmæssigt set, den synes jeg ikke, den blev der egentligt ikke ændret. Den blev justeret undervejs og der blev også vedtaget et nyt strategipapir i 3, vel, eller sådan." (Hedevang 2010)

This change, this formalization, in nature is significant to understanding in the creation of an 'us' in NorCOM versus 'them' outside NorCOM way of thinking, because by charging membership fees the question of who could be members and who could not became more important than it had been earlier, when people had been invited relatively broadly through newsletters etc. Further, with the establishment of a board of directors, the political issue of who should be on this board and thus have influence also intensified.

To understand the development of the NorCOM association in the late 1990s until 2000 where the club becomes formalized and the NorCOM association emerges as well as the dynamics occurring in the following years until the association is merged with the association IT Forum in 2010, I will argue, that there are two discussions, or discourses or dynamics, we need to understand and illuminate in detail.

The first is a discourse, which emerges in the late 1990s and remains a focus issue in the NorCOM association until the merger with IT Forum, and this is a discourse about a need for business competences within NorCOM.

The other dynamics is a struggle, which unites the members of NorCOM, and helps them maintain a unity. It is a struggle which takes the place of the first struggle the people in the cluster experienced, which was the struggle of Dancall and Cetelco, united in DC Development, against the largest players in the industry as discussed before. It took me years of going through the data on the cluster, articles, interviews, scientific work etc., before I realized, that what was binding the cluster together, giving the members a sense of unity in the latter part of the history of the cluster, from the late 1990s and onwards, was also a struggle, but not a struggle as the one which was seen with DC Development, where it was companies in the NorCOM association joining together in a struggle against the big companies outside the cluster. The struggle in the latter part of the story was a struggle where the companies were united in a struggle against other organizations and institutions locally in Northern Jutland and in Denmark. A struggle against parts of the municipality, parts of the county, parts of the local university and against other local organizations such as Mindwork and IT Forum.

It is only possible to understand why the recurring discussions about the need for business competences in the NorCOM association remained a recurring discussion, and relatively little actually changed in this regard, in all these years, if we understand that the struggle occurring simultaneously against other institutions and organization, as well as the dependency relationships to many MNCs, came together in a configuration of force relations which meant, that business were interpreted in a rather specific and special way within the NorCOM association. A way which also meant, that although a number of business possibilities were open, according to people with other perceptions of business, these were not pursued. To make this argument, let us begin with the recurring discussions about business.

8.6.1 Business competences in NorCOM, a recurring discussion

When the NorCOM association started in 1997, one of the objectives was to promote the cluster, and this was mainly something, which was done in the media. We saw in the previous chapter how a series of articles in *Ingeniøren* through the latter part of 1997 was used to create and articulate a story about the cluster and its success, and how this success statement gained momentum in the media in the following years, and how the NorCOM association created a unity through this discourse. Another rational behind forming the association was as discussed to promote knowledge sharing within the organization. Let us therefore turn to this internal issue now, and thus the internal workings of the organization and how business was also put on the agenda here.

At the time of the first *Ingeniøren* article mentioned above, there had been two NorCOM meetings with presentations, and the focus has been business, and information about where the market was moving:

“In this way, L.M. Ericsson and Nokia, who belong amongst the world’s absolute biggest companies in mobile phones and infrastructure, such as mobile systems, centers, and basis

stations, have reported on the direction of their developments. The University of Aalborg are in charge of both academic overviews as well as industry news. – At NorCOM's meetings there is a lot of interest in the industry news, that we are collecting at the university. In particular amongst the smaller companies that does not have the resources to systematically keep updated about developments in the marketplace, says Bent Dalum"

"Således har L. M. Ericsson og Nokia, der på verdensplan hører til blandt de absolut største inden for mobiltelefoner og infrastruktur dvs. mobilsystemer og -centraler og -basisstationer, berettet om den vej deres udviklingsarbejder går. Aalborg Universitet har stået for såvel forskningsmæssige oversigter som kommercielt branchenyt. – På NorCOM-møderne har der været stor interesse for de kommercielle branchenyheder, vi løbende indsamler på universitet. Det gælder især de mindre virksomheder, der ikke selv har ressourcer til systematisk at holde sig opdatere om udviklingen på markedet, siger Bent Dalum" (Thomsen 1997a, p.4)

We see here that Bent Dalum from the business department at AAU argues that there has been a "huge interest" in the commercial news at these meetings. This however stands in contrast to the views expressed in interviews with the key people involved in NorCOM. As they recall it, the interest was in technical issues, not business. The fact that the business news might not have been as valued as described by Bent Dalum is also shown in the same article:

"The first two NorCOM meeting get the following review from CEO Finn Andersen from GSM-developing firm ATL Research I/S in Aalborg: - Thus far most of the participants have listened a lot and not spoken much. If that will change, the future will show. However, we speak well with several companies, while there are others we did not make contact with. A number of us are competitors, so there is a tendency that some of the companies are playing their cards close to their chest. It is probably a bit early to say anything about the club will develop, but we think that this far it is a good initiative, says Finn Andersen"

"De to første NorCOM-møder får følgende skudsmål fra administrerende direktør Finn Andersen i det nordjyske GSM-udviklingsfirma ATL Research I/S i Aalborg: - Hidtil har mødedeltagerne være meget lyttende og meget lidt talende. Om det vil ændre sig, vil fremtiden vise. Vi snakker dog godt med flere af virksomhederne, mens der er andre, vi ikke har kontakt med. En del af os er konkurrenter, så der er en tendens til, at nogle virksomheder i første omgang holder kortene tæt til kroppen. Det er lidt vel tidligt at sige noget om, hvordan klubben vil udvikle sig, men vi synes, det indtil videre er et godt initiativ, siger Finn Andersen" (Thomsen 1997a, p.4)

Relatively quickly after the creation of the association, two types of information flows were established in the association, according to Niels-Christian Gjerrild, who was the first chairman of NorCOM. As the use of e-mail became more and more widespread, two mail lists were created, one for CEOs and one for everybody. In the first information of interest to managers was spread, and in the latter information about activities in the association and information about the organization itself was spread. As Niels-Christian Gjerrild recalls it, access to the latter was free, but not a lot of people signed up. Therefore, to gain support for events created by the organization, such as presentations by researchers, CEOs in the member companies did what they could:

"... and we did a lot in the companies to encourage people to sign up and also get people to show up for the events, when we had an event with some kind of professional content, then we would go around to the companies, and find those 2-3 or 5 people, however many there might be, well, it was a small handful, and then we would point to them and say, would you be interested in hearing about this and this."

"... og vi gjorde jo i virksomhederne meget for at opfordre hinanden til at få folk til at melde sig og også få folk til at dukke op til arrangementerne, sådan at når man havde et arrangement, med et eller andet fagligt tilsnit, så gå rundt i virksomheden selv og finde de der 2-3 el-

ler 5 eller hvor mange det var, altså det var jo en lille håndfuld, og så pege ud og sige, har du ikke lyst til at høre noget om det det og det.” (Gjerrild 2010)

The association thereby had the nature of an ERFA group, mails would be sent out with information about coming events, and these would primarily be presentations by people from the industry or people from the university. The attendance to the events made by the NorCOM association was relatively stable when looking at CEOs of the member companies, who would come to most of the events. However, the attendance of employees was highly fluctuating, according to interviews with key people, certain themes would have a large audience while others would have almost no attendance of engineers, who constituted the bulk of the employees in the companies. The first chairman of NorCOM Niels-Christian Gjerrild thus explained:

“It has varied a lot, that I can say, management support has been pretty, with a few changes, that is expected, but it is has been pretty consistent. While the engineers, that has varied a lot. A lot. Because was there an event about the market, something about marketing, that was really not something for the engineers, they just did not show. The events with the biggest turnout by far, was when we had one or two from Skype, come in and talk about the algorithms that they used, what is behind, hold on, there were a lot of people.”

“Det har svinget meget, altså jeg vil sige, fra leder tilslutningen, den har været rimeligt, selvfølgelig nogle få udsving, det er klart, men den har været rimelig jævn. Mens ingeniørerne, det har svinget meget. Rigtigt meget. Fordi var det et indslag om markedet, sådan noget der havde noget markedsførings, det var der ikke sag i hos ingeniørerne, det mødte man ikke op til. Mens det arrangement der var absolut flet til, det var da vi havde en eller to fra Skype der var inde og fortælle om de der algoritmer, som de nu havde brugt, der er bagved, hold da fast der var mange mennesker.” (Gjerrild 2010)

The interest among engineers was mainly in presentations dealing with technical issues:

“There more technologically hairy it was, the more engineers showed up. That was pretty consistent. And then there are the total outlier, which is when Tom Kristen came to visit, but that is not because, well, that is because it is Tom Kristensen [A famous Danish racing driver]”

“Jo mere teknologisk langhåret det var, desto flere ingeniører kom der. Det var sådan ret konsekvent. Og så er der lige den der falder helt ved siden af, da vi havde besøg af Tom Kristensen, men det er jo ikke, det er jo fordi det er Tom Kristensen [En berømt dansk racerfører].” (Gjerrild 2010)

Among leaders a focus existed on technology as well as business, according to interviews. And the key members of the NorCOM association made an effort to try to distribute business knowledge to the engineers also, for example by hosting events where the presentation had both a technical as well as a business aspect. The first chairman gave an example of such in an interview:

“I invited different companies to attend, mainly suppliers to come and talk about their solutions to how they would solve, how they expected to solve a specific task. And that was of course both about the market, well, it was both about how the market would develop and also about which technologies there were, and do a few demonstrations of it, well, it was about trying to turn it upside down and say, well, it is about selling, but it can also be fun”

“Jeg inviterede nogle forskellige firmaer til at komme, altså leverandører til at komme og fortælle om deres bud på hvordan de ville løse, hvordan de forventede en specifik opgave blev løst. Og det er selvfølgelig både hvordan markedet, altså det var både hvordan markedet ville udvikle sig, og også hvilke teknologier der var, og lave nogle demonstrationer af det, altså prøve at vride den rundt og sige, jamen det der med at få noget solgt, det kan også godt være sjovt.” (Gjerrild 2010)

How did this focus upon business emerge? This was due to two things, one being that business and marketing competences were seen by managers within MNC subsidiaries as a way of getting power within MNC organizations, the other one being the dynamics surrounding the technological development.

8.6.1.1 Business knowledge as power within MNCs

As argued by (Gelsing & Brændegaard 1990) business and marketing capabilities were lacking in the NorCOM cluster. This argument fits the findings in my interviews well. In an interview I conducted with Rauff and Sørensen in 2010, (Rauff & Sørensen 2010), we discussed the role of marketing knowledge, and they explained that they themselves also lacked the marketing knowledge at the time of Cetelco.

Rauff: ... we had that problem, we were ourselves fixated on technology

Sørensen: We are engineers

Rauff: And that was why, that was also why we had a hard time keeping up. Because we focused on the technology and says, well alright, we need new technology, and we could see how it looks and we start work in it, well, then we had to create it. But we did not really understand the market mechanisms in it before, well, yes then we understood them, and then we made sure to get out in time.

Reinau: What was the eye opener, if you can say that

Rauff: It was the overdraft. It is clear because we are developing and developing and we did not sell enough.

Sørensen: And we are not, as such a small company, it requires a huge effort to do marketing. And it costs just as much money to market it, as it costs to develop it. But the ones we are giving the money to do not understand that. But that is the case when it comes down to it."

Rauff: ... vi havde jo selv problemet, vi var jo selv teknik fikseret

Sørensen: Vi er ingeniører

Rauff: Det var jo også derfor, det var jo også derfor at vi havde svært ved at følge med. Fordi vi var fokuseret på teknikken, og siger jamen ok, der skal noget nyt teknik til, og vi kunne godt se hvordan det ser ud og giver os så i kast med, jamen så må vi jo få lavet det, og så må vi få lavet det. Men vi forstod jo ikke rigtigt markeds mekanismerne i det før, ja det forstod vi så, men der sørgede vi også for at komme ud i tide jo.

Reinau: Hvad var øjenåbnere hvis man kan sige det sådan

Rauff: Det var kassekreditten. Det er jo klart fordi vi udvikler og vi udvikler, og vi får ikke solgt nok.

Sørensen: Og vi jo ikke, som sådan en lille virksomhed, så kræver det en kæmpe indsats og lave markedsføring. Og det koster lige så mange penge i markedsføring som det koster at udvikle det. Men det kan dem vi skal aflevere penge til, det kan de ikke forstå. Men det gør det jo når det kommer til stykket." (Rauff & Sørensen 2010)

So Rauff and Sørensen entered the market for mobile phones out of technological considerations, as we have seen above. This supports the argument made in (Gelsing & Brændegaard 1990) that technology was the main focus in the industry. But did they have the needed business and financial competences? Today the two engineers have started more than 30 companies to-

gether (Rauff & Sørensen 2010), so one must say yes to this question. But did they have it back in the 1980s or is it something they have learned afterwards? They said themselves in the interview that they were technicians, but they realized, as the story above shows, that by making products available at a lower price than their competitors, they were able to compete and gain large market shares in different maritime positioning systems. So apparently they had the needed business competences for navigating the relative stable waters of the maritime navigation equipment market. However, as the story also shows that when they went into the mobile market, they lacked the competences needed to compete in this dynamic market. They did not understand the market, the market was moving fast, and they were losing money. So all in all, the conclusion must be that yes they had business talent, but they lacked certain competences related to business, for example marketing skills, to compete in the mobile market. The story of Cetelco thus supports the point made by (Gelsing & Brændegaard 1990), that focus was upon technology, at the cost of business and financial competences, which were lacking.

The quote above also illustrates another important dynamics, and this was that the “way out” for the two engineers Rauff and Sørensen, was to sell their company, in the case of Cetelco to German Hagenuk. This was a way out, which through the 90s became the goal, the recipe for success became, to make an R&D company and then become acquired by a MNC. This transferred the issue of business and marketing competences from being something, which had to be handled locally in the cluster, to be something, which was handled elsewhere in headquarters scattered around the world.

This did not, however mean, that business capabilities became something which was unnecessary, because during the latter part of the 1990s managers in NorCOM companies started to feel, that they were coming under increasing control from external headquarters, as MNC ownership in the cluster increased. And one idea, which emerged in the discussions within the NorCOM organization, was that by understanding where the market was moving, managers in the MNC subsidiaries could potentially get more power within the MNC organizations, as Niels Christian Gjerrild explained:

“That comes into play at a certain point, where we begin to, well, that is again a case, a combination of us beginning to see that too many things are controlled too much from the outside by these big, these companies that have taken over. Now you have used TI as a case, that could just as well have been Nokia or Ericsson or, well, where business decisions were made somewhere else than here entirely. And we had no influence on them. And they way that we tricked ourselves into believe that we could influence it, that is by understanding more and more of the market, we simply do not have access to the market decision makers in Stockholm or Munich or wherever they were located, but we thought that we could influence them, if we present them with some gizmo or something and says, we think there is a market for this, then maybe we could.”

“Det kommer jo på banen på et tidspunkt, hvor vi begynder at, ja, det er vel igen noget, en kombination af at vi begynder at se nogle ting der bliver styret lidt for meget udefra i de her store, altså i de her virksomheder som har overtaget. Nu har du brugt TI som case, og det kunne lige så godt være Nokia eller Ericsson eller, altså, hvor de markeds-mæssige beslutninger de bliver truffet helt andre steder end her. Og dem har vi ingen indflydelse på. Og så måden vi bilder os ind at vi kan få indflydelse på det, det er ved at jo mere vi kommer til at forstå af markedet, vi har simpelthen ikke adgang ind i de der markeds beslutningskredse i Stockholm eller München, eller hvor katten de nu sad henne, men mener alligevel at kunne påvirke det, for kommer man nu med en teknologidims eller noget, og siger, vi tror der er et marked for sådan noget her, kunne man så ikke.” (Gjerrild 2010)

He further elaborated on his own experience as a CEO in Ericsson in relation to this:

"We [the managers in NorCOM] all experienced it. Each in different ways. Let me use a case I know most intimately, the Ericsson case, but all the others experienced something similar, other words, other technologies but that does not matter. Ericsson established the department on DECT. There was Danish DECT development and it was this DECT competency that we built up and that Ericsson found out about and wanted to use. Ericsson did not have this competency, did not have it themselves, and at that point in time I used it as a story of success, I would say a company of 60.000 employees and they had to establish a department in Aalborg because there was five people there with this competency that this company did not have. And that is not a tall tale, that was how it was. Because this core competency about how DECT worked and how the specifications were put together etc, we had that. We had among other things contributed to the specification. Well, and this DECT group, it grew quite rapidly. And at one point there are about 40 people. We all worked on DECT, in different ways, DECT for wireless phones, for the home, for companies, and DECT as a replacement for the cable that connects the distribution box in the street with the houses. What we call the last mile, in that context. Right, we all had our different areas of focus but it was all DECT related. And then suddenly there is a strategic decision at Ericsson Stockholm, that no, Ericsson would not be using DECT for the last mile. And then from one day to the next I have 20 people, it was the biggest single group, about 20 people with nothing to do. Of course there was some kind of warning, but in principle half of my business disappeared because product, in the product development group they had decided that no, that was not the way forward, we have to choose a different way. And then what do you do. It was an example of how we thought we had a good business, and that we were good at it, and that we could do everything, and we could, technically, but we did not have any influence on the product. Then I had to rather urgently come up with a different plan. And I succeed in finding other things. By going around with my sales suitcase internally, I managed to find other tasks, so I did not have to fire anybody but our growth rate was a bit flat for a while, until I managed to find something else, some GPRS, and actually also a little bit of Bluetooth, which turned into a bit more Bluetooth, which turned into blips systems over time. And we all experienced that, that some decisions, from one day to the other, hey, we are not doing that or we did not get the contract that we were bidding for. I said that I was touring the company with my sale suitcase, the Ericsson corporation worked in a way that when somebody had something to do, there was a product owner, and they are the ones who are in charge of product management, and responsible for selling it and owned the product, and they could be anywhere. And somebody had to develop it. And that somebody, they have R&D in 21 countries, and some with multiple centers."

"...vi [Managere i NorCOM] oplevede det jo alle sammen. Hver på forskellige måder. Lad mig bruge noget af det jeg kender til som, kender tættest til, nemlig Ericsson casen, men alle andre, eller i hvert fald de fleste andre oplevede jo tilsvarende, nogle andre ord, nogle andre teknologier, men det er lige meget. Det som Ericsson etablerede afdelingen på, det var DECT. Det var dansk dect udvikling, og det var den DECT kompetence som vi byggede op, og den finder Ericsson ud af at den kan vi bruge. Ericsson havde faktisk ikke den kompetence, havde den ikke selv, og på det tidspunkt, jeg brugte det jo som en succes historie, jeg siger en koncern på over 60.000 mennesker, de er nødt til at etablere en afdeling i Aalborg fordi der sidder 5 mennesker, der har en kompetence, som den koncern ikke har. Og det er ikke sludder, det er fuldstændig korrekt, det var sådan det var. Fordi den spidskompetence om hvordan DECT var, og hvordan specifikationen var skruet sammen, og sager, den havde vi. Vi havde bl.a. været med til at lave specifikationen. Nå, og den her DECT gruppe, den bliver jo større forholdsvis hurtigt. Og vi er på et tidspunkt små 40 mand. Vi arbejder med DECT alle sammen, i forskellige afskygninger, DECT til trådløse telefoner, til hjemmebrug, til virksomheds brug, og DECT i, som erstatning for det der kabel der går fra distributionskassen ude i gaden og så ind til husene. Altså lige det der, the last mile, som det hedder i den sammenhæng. Altså vi havde hver vores fokusområde, men det var DECT det hele. Og så pludselig bliver der truffet en strategisk beslutning i Ericsson Stockholm om, nej Ericsson vil ikke bruge DECT til den der last mile. Og så fra den ene dag til den anden sidder jeg med små 20 mænd, det der var den største enkeltgruppe, og så sidder jeg med små 20 mænd som ikke har noget at lave. Selvfølgelig er der et vist varsel i det og det der, men i princippet falder halvdelen af min for-

retning væk sådan fordi man i produkt, i produktovervejelsesgruppen finder ud af, nej, det er nok ikke den vej vi skal gå, vi skal gå en anden. Og hvad gør man så. Det var sådan et eksempel på at forretning som vi tror vi har godt og vi er dygtige, og vi kan det hele, det kunne vi også rent teknisk, men vi havde ikke indflydelse på produktet. Så måtte jeg jo barbu barbu i gang med at finde ud af hvad gør vi ved det her. Det lykkes så at gafle nogle andre ting til. Ved at rejse lidt rundt med salgskufferten internt og så få gaflet nogle andre opgaver hjem, sådan at jeg skulle ikke ud og fyre en eneste, men vækstraten den lå lige fladt der i en periode indtil jeg fik noget andet skubbet ind, noget GPRS og det blev faktisk også til en lille smule bluetooth, og det blev så til lidt mere bluetooth, og det er så det der blev til blip systems, efterhånden. Og det oplevede vi alle sammen, at sådan nogle beslutninger, lige pludselig fra den ene dag til den anden, hov det skal vi ikke alligevel, eller den der opgave som vi nu byder på, den fik man ikke. Nu siger jeg at jeg dragende rundt med salgskufferten internt i Eriksson, koncernen fungerede på den måde at når man havde noget der skulle laves, der var en produkt ejer, og det er dem der sidder på produkt management, at skulle have det solgt, og var produkt ejere, og de kunne sidde hvor som helst. Og nogle skulle så udvikle det. Og det der nogle, man havde udvikling i 21 forskellige lande, i nogle lande flere udviklingscentre.” (Gjerrild 2010)

We see in this story a strong similarity to some of the dynamics we saw in the TIDK story, namely that the CEO of the subsidiary within NorCOM feels that important road map decisions are taken without their influence in the headquarters or other sites, and that the sudden effect of such decisions impacts their organization negatively. In this case, Ericsson lost work for half of its employees with the decision to cancel DECT development for last mile services; in the TIDK case, TIDK lost a significant part of their employees when TI decided to locate software development in Mexico. That Niels Christian Gjerrild, who was one of the key persons in the NorCOM association and the first Chairman, with a detailed knowledge of many of the companies, argues that this dynamics hit almost all of the companies, further shows that the dynamics we saw in TIDK, where managers felt they lost control of their companies, was not a dynamics specific to the TIDK case, but a more widespread phenomenon within the cluster. Niels Christian Gjerrild further explained that in the case of Ericsson, the employees never started to feel alienated from work because of pressure on the work and resource control from Ericsson. This seems to indicate that Ericsson never reached a state where the impact of the MNC organization became as clear as in the TIDK case. This is probably because Eriksson site closed before the market reached the state where pressure were on cost and time to market and GSM had become a mature technology.

The need for these competences, which we may call business competences in relation to the situation within the MNC subsidiaries, i.e. competences which give the managers in these more power within their organization through knowledge about where the technology and market are moving, were also seen from NOVI, who supported a focus on other issues than the technological, to make sure that the association did not become solely a technical association.

“Well, Novi assumed that role and tried to keep it together, and be the driver in it. So there are probably some people who think NOVI interfered too much or not enough, but if we had not interfered back then, then it would have fallen apart. Then it had been a technical association, where we would meet to discuss if one bit should be one way or the other. I can imagine that, it was very technical, right. And we tried to get other things in. We tried to find resource people, from NOVI and NorCOM, to say, well, now you will be told something about how to treat your employees, right. That they have a wife and kids, and that they have birthdays, and all that. And once in a while you need to account for that. And that was difficult for some, to tear themselves away, right.”

”Jamen altså, NOVI påtog sig jo den rolle og ligesom at holde sammen på det, og være drivere i det. Så er der nok nogle der synes at NOVI blandede sig for meget i nogle ting, eller for lidt, men hvis vi ikke havde blandet os dengang så var det, så var den gået i opløsning. Så

havde det været sådan en teknisk forening hvor man havde mødtes ikke, og diskuteret om den ene bit skulle stå den ene eller den anden vej. Sådan noget kunne jeg forestille mig, det var meget teknisk orienteret ikke. Og der prøvede vi ligesom at få nogle andre ting ind. Vi forsøgte ligesom at finde nogle ressourcepersoner, fra NOVI og NorCOMs side også, til at sige, jamen, nu får I noget at vide om hvordan medarbejderne skal behandles også, ikke. At de har kone og børn og de har fødselsdage og alt sådan noget. Engang imellem som man også skal tage hensyn til. Det var jo svært for nogle af de der ligesom at løsrive sige, ikke" (Jespersen 2010)

8.6.1.2 Technology becomes mature

Another dynamic that also helped increasing the focus on business competences were the technological development. In the 90s when the NorCOM club appeared more like an ERFA group, there was a technical focus in the majority of the presentations. This was also the time, where the technology was still relatively young, meaning that the technological challenges were relatively big. And this had implications for the meetings. Jørgen Hedeving thus explained how, for example, back when it was still a challenge to make a functioning antenna, there would be a big interest in the meetings, and people attending the meetings would listen to every and each point with a pioneer attitude. A situation which changed, however, when the technology became more mature and the focus therefore was moved more to the question of how to sell and use the technology:

"... when it was a real accomplishment to make the antenna work, then there was bang for your buck at the ERFA meetings, people were listening to every comma, right. You can probably imagine, that it is being created, right. That is pioneering, that is the pioneer phase of a technological development, where it became something else entirely when it was a commodity, when it became a matter of course, that we had baked the whole thing into one piece of silicon and in there is a million transistors and that is that"

"... da det virkelig var en præstation at få en antenne til at virke, der var der eddermanne smæk på ERFA møderne, der blev der lyttet til hvert eneste komma, ikke. Det kan du næsten forestille dig, at der er ved at blive skabt, ikke også. Det er pioner, det er pionerfasen af en teknologiudvikling, hvor det blev noget helt andet da det var commodity, altså en selvfølge, at vi har bagt hele skidtet ind i en, i et stykke silicium, og der sidder så en million transistorer derinde ikke også, og så er det det." (Hedeving 2010)

This change was, according to Jørgen Hedeving towards a situation where instead of focusing on the actual technical details of a given technology, focus would be on a technology on a more general level, and on how the association could support the development of this technology in the region:

"... that means that these fundamentally professional experience development sessions, they change character to something like, then we could become very preoccupied with software based radio, then it would become something completely different, and then you could get together and try to find funding for that. It was for example NorCOM's achievements that we really supported and that there was an environment, and there were this large grant for software defined radio, which Peter Koch currently sits with. That is where NorCOM was active, and it is a given that the existence of NorCOM, the fact that people in application situations have been able to point to an industry, with strong ties to the university's research side and educational side, and which was solid and visible, people could always go to the web page and then it would be updated. That has definitely granted easier access for people."

"... det betyder jo at de der helt grundlæggende faglige erfaringsudviklings seancer de skiftede karakter til sådan noget med, så kunne vi blive optaget f.eks. af den der softwarebaserede radio, så blev det sådan noget helt andet, og så kunne man så samle sig om at prøve at understøtte at der skulle komme en bevilling til det. Det var f.eks. en af NorCOMs fortjenester at

vi virkelig støttede og der virkelig var et miljø, og så kom den der store bevilling til softwaredefineret radio, som Peter Koch han sidder med i dag. Der var NorCOM jo aktive, og der er det helt givet at NorCOMs eksistens det er at man i mange ansøgningssituationer har kunnet pege på en industri der virkelig havde knyttet bånd med universitetets forsknings side og uddannelses side, og var solid og tydelig, man kunne jo altid bare slå op på hjemmesiden, og så var den opdateret. Det har helt givet betydet lettere adgang til folk.” (Hedevang 2010)

This dynamic became clear around the beginning of the 2000s with the report “Vision Nordstjernen”, which I shall return to later. At that point the situation was that the companies possessed the GSM competences, and as the technology moved on, the issue became what should succeed GSM. When I turn to this vision I will also go into the discussion about the struggle with other institutions and organization which emerged at the same time, and therefore I will leave this discussion out for the time being, and instead maintain a focus upon the discourse surrounding business competences in NorCOM.

Interviews showed, that the issue about a need for more business competences within the NorCOM cluster remained a recursive discussion throughout the remaining part of the NorCOM association’s history, and let us therefore look closer at what was said about this discussion in the interviews.

8.6.1.3 The construction of business within the NorCOM association

The situation was, in the 1990s as well as the 2000s, that there were not top-quality marketing people in Northern Jutland. As an example we can take the experiences of Jesper Jespersen at Sonofon. Aalborg was, as explained earlier a good location for Sonofon seen from a technological perspective, because the needed engineers were available, but from a marketing perspective it turned out to be a less desirable location, since it was impossible to find top notch marketing people in Aalborg, as he explained.

“From a market perspective it was not great to be established in Aalborg, we could not attract top-notch marketing people, they could not be bothered. They live in Copenhagen, and they cannot be bother, with Jutland, that is more than dark, if you look at them.”

“Ud fra et markedssynspunkt var det ikke så godt at etablere sig i Aalborg, vi kunne sku ikke hente de der top-notch marketing folk, de gad ikke. De bor i København, og sådan nogle gider da ikke, altså, Jylland det er jo mere end mørkt, hvis man ser på dem.” (Jespersen 2010)

Likewise, Niels Christian Gjerrild explained, that people with high quality competences in marketing were unavailable in the region, and the reason according to his view was the lack of a business school in the same league as Copenhagen Business School:

“We do not have, we have, if you look at AAU and compare it; then we have real technological strengths and also a really long history in, a good tradition. There is not a Copenhagen Business School here, where you have marketing people and marketing degrees that in volume and profile-wise can compare with CBS or do you, no, it is not, there is a bit and a little is done. Well, I know this, when we tried to find salespeople later on, and I have heard from head hunters who have been chasing sales people, that they virtually do not exist in Northern Jutland. Sales people and good sales people, yes, but not people with market, people who know a lot about marketing, international marketing in particular, on a major scale, they do not exist here.” (Gjerrild 2010)

“Vi har jo ikke, vi har jo, hvis du kikker på AAU, og sammenligner, så har man jo virkelig en styrke indenfor den teknologiske side, og også en rigtig lang historie indenfor, en god tradition. Der ligger ikke nogen Copenhagen Business School her, hvor man har nogle markedsførings folk og nogen markedsførings uddannelse som i volumen og profilmæssigt sådan mat-

cher CBS, eller har man, nej det er i hvert fald ikke, der er lidt, og man gør lidt. Altså jeg ved også fra, jeg har selv prøvet på senere tidspunkter at skulle finde salgsfolk, og også hørt fra headhunters som har jagtet salgsfolk, de findes praktisk talt ikke her i det nordjyske område. Sælgere, og dygtige sælgere, jo, men folk som har markeds, altså ved en helt masse om markedsføring, international markedsføring i høj grad, i sådan storskala, de findes ikke her.” (Gjerrild 2010)

So the companies in NorCOM did not have a population of marketing people in the region that they could hire and use. Turning to how the managers in the NorCOM association, that led the companies, saw the need for business competences, the interviews revealed, surprisingly, that the majority of these managers were engineers themselves, some had taken MBA’s later in life, but by heart, the majority were engineers and their hearts therefore lay with technology, not business. Let me now try to elaborate on this.

To understand this we may first look at what was done in the club in the late 1990s and onwards to strengthen the business and marketing competences. According to the interviews, everyone in the association agreed that it was important to strengthen business and marketing competences, and some of the people trying to drive this development sought to do so through events, which contained a technological as well as a business and marketing side, as mentioned earlier. But how was this received among engineers and managers in the NorCOM association?

To exemplify this, let us look at one of the events held by NorCOM, the one in the history of NorCOM, which had the most visitors. This event was a presentation in the late 2000s by Tom Christensen, a Danish racing driver that had won the Le Mans race a number of times, and is a celebrity in Denmark. He gave a presentation on what it took to win a Le Mans race, and his focus on the team and the team dynamics came as a disappointment to many engineers present, as explained by Jesper Jespersen:

“... I remember this one time when Tom Christensen, the race driver, he visited, there was a 120 people present, and they thought it was a mindnumbingly boring lecture, because he talked about all the things you had to go through to win Le Mans, but he did not talk about the technical side. He did not say anything about how many radios he had in his car, that was measuring the heat of the bearings or whatever, or if he could adjust the ignition at 330 km/h down the long side of the track. He would not reveal that, because that he had told, because he had promised AUDI he would not talk about it. He did not tell. They were very disappointed because he talked about what it took to succeed, what is necessary in a team and how you need to have confidence in the team, and that you need to trust people to do their part without having to check on them and so on, right. That was not interesting to the engineers that day.” (Jespersen 2010)

“... jeg kan huske en gang Tom Christensen, racerkøreren han var inde, der var 120 og høre på ham, og de syntes det var et død sygt foredrag, for han fortalte om hvordan man, hvordan man, alt det man skulle igennem for at vinde et Le Mans, men han fortalte ikke noget om teknikken vel. Han fortalte ikke noget om hvor mange radioer han havde ombord i den der bil, der sad og målte på hvor varme hjullejerne blev eller hvad fanden ved jeg. Og han kunne justere tænding med 330 km i timen ned af den lange bane. Det ville han ikke afsløre vel, fordi det havde han jo sagt, det havde han lovet AUDI det ville han ikke fortælle. Han sagde det ikke. De var meget skuffede fordi han fortalte hvad skal der til for at det her lykkes, hvad er det for et nødvendigt team man skal have og den tillid man skal have i teamet til at hver har sin plads og tingene bliver gjort uden at man skal kontrollere det og alt sådan noget, ikke også. Det var ikke interessant for de der ingeniører den dag der.” (Jespersen 2010)

Niels Buus used the same event as an example of the issue and explained that it had given rise to discussions within NorCOM as to whether it was really as success or not:

"The very best visit of all of them, that was at a time when it had nothing to do with the case at all, that is when we got Tom Kristensen here...

... and that also tells a bit of a story, right, and we had a bit of doubt about how we should tally it at the end, whether or not it was a success, and if we should do it more often etc. but there was definitely a social element to it. A lot of people showed up who had never attended before, and a group of employees who had never been to a NorCOM event before, at that point in time."

"Den aller aller bedst besøgte af dem alle sammen, det var på et tidspunkt hvor det slet ikke havde noget med sagen at gøre, der fik vi Tom Kristensen op...

... og det fortæller også lidt en historien ikke, og vi var sådan lidt i tvivl om hvordan vi skulle gøre det op bagefter, om det var en succes eller det ikke var, og vi skulle gøre det mere osv., men det var i hvert fald et socialt element der var i det. Der kom rigtigt mange derud som aldrig nogensinde havde været til, og der kom en gruppe af medarbejdere som aldrig nogensinde havde været til NorCOM arrangementer på det tidspunkt, ikke." (Buus 2010)

It should be noted, that although, the interest was mainly the technology, other issues could also attract interest, but these were more issues with a personal character, as Jesper Jespersen further explained, when asked why the engineers were so focused on technology:

"Well, I do not know. I do not know, I did wonder about it too, right, that they were so fixated on technology, you can say. But they did show up if somebody came to talk about how to take care of the kids and have to achieve a everyday life in the family that works etc. etc. then a lot of people showed. And if Chris MacDonald comes, then there are also a lot of people. But perhaps it is a different type, I do not check who is who." (Jespersen 2010)

"Jamen, det ved jeg ikke. Det ved jeg ikke, det undrer mig også, ikke, at man er så teknik fikseret, kan du så sige ikke. Men de kan godt møde op hvis der kommer en og fortæller noget om hvordan man skal tage sig af ungerne og have en hverdag i familien også der fungerer osv. osv., så kommer der mange. Og hvis Chris Macdonnel kommer, så kommer der også mange, ikke. Men det er måske en anden type, nu står jeg ikke og kontrollerer hvem det er" (Jespersen 2010)

So apparently the engineers did not have an interest in business issues, neither in the beginning nor towards the end of the history of the NorCOM association. How about the managers in the association? One of people who, according to the empiric data, did most to enhance the focus on business in the NorCOM association was Niels Buus, who was chairman of the organization for a number of years in the middle of the 2000s. Jørgen Hedevang thus explained:

"It slowly began [a focus on business] as I described earlier, well, when the professional aspects began to become ordinary. Something we could do, the we had to, then focus was moved to the business aspects. So it was not something that only came with Niels, but Niels was probably the one who most clearly, as a part of the association, during his tenure as chairman said, this is something we has to do something about."

"Det begyndte da så småt [Fokus på business], som jeg også beskrev tidligere, altså når det faglige ligesom begyndte at blive almindeligt. Noget vi godt kan, så skulle vi, så flytter fokus over på det forretningsmæssige. Så det var ikke noget der kun kom med Niels, men Niels han var nok den der tydeligst som foreningsmand i hans formandsperiode sagde, det der, det skal vi altså gøre noget ved." (Hedevang 2010)

Let us therefore focus on how Niels Buus experienced the discussion around business competences in NorCOM. He agreed that he did make an effort to enhance the business focus in the

NorCOM association but, as he explained in an interview, he did not manage to change the focus of the organization:

"...Well then, if I struggled with it, then the struggle was failed. And I did, it failed. That is, now I do not know about the last year or two, so it may be, but it is my impression that a little bit more has happened, after the development departments, they were actually closed, right. So a bunch of people are now sitting there with some concrete needs to get some products made, come out and do it. And that force, that lies in having to figure something out, I would not underestimate that..." (Buus, 2010)

"...Jamen altså, hvis jeg har ført en kamp med det, så er kampen mislykkedes. Og det har jeg, den er mislykket. Det er, nu kender jeg ikke det sidste års tid eller to, så det kan være, men det er mit indtryk at der sker en lille smule mere efter at nu er de her udviklingsafdelinger, de rent faktisk er gået hun og blevet lukket ikke. Så sidder der nogle mennesker med nogle konkrete behov for at få nogle produkter lavet, komme ud og gøre det. Og den kraft, der ligger i at man skal finde ud af et eller andet, den vil jeg ikke undervurdere...." (Buus 2010)

Looking more generally at the situation he argued, that not enough was done to support the business focus in the group, steps were taken, for example the creation of a Master of Technology Management at AAU, but as he saw this, this was not done with the needed commitment:

"Buus: well, I do not think I did, you cannot say that, there was not done enough in any way, but some of the things I tried to argue for, that we should do, I tried to argue it in the Vækstforum, that we should look at it, I tried to argue it to the management of the university, that we needed to look in that direction, try to get more things going. They did take some concrete actions about that technology; master of business, and that master of management, master of technology

Reinau: MNT?

Buus: Yes, master of technological management, they planted a seed with that, and it was definitely a step in the right direction, but it was kind of, it did not get very far because it was kind of like, we will offer it if enough people are interested. That is not a way to develop a business. You could say that from the university's side they should have said, we want to develop a business in this area, so now we have to go out and get them, not only from Aalborg, but also get them from further afield, to get the best. That has probably been difficult, you should not sneeze at that, we tried it ourselves at Gatehouse, all the time, preaching that it was the business aspects that we tried to make the driver for the whole thing. Because that has the survival power, right. That is what I think, always try to spot, spot the business aspect, spot opportunities in it etc. We tried it with ESA, where we tried, that was mainly subsidized, but anyway, it was trying to come at it from that angle." (Buus 2010)

"Buus: Jamen jeg synes ikke jeg gjorde, det kan man ikke sige, der blev gjort nok på nogen som helst måde, men noget af det jeg prøvede at argumentere for, at vi skulle, jeg prøvede at argumentere for det i vækstforum at vi skulle kikke på den ting, jeg prøvede at argumentere overfor universitetets ledelse at vi skulle kikke i den retning, prøve at se om ikke vi kunne få noget mere op og stå. De gjorde nogle konkrete tiltag omkring den der teknologi, mb, den der master of management, master of technology

Reinau: MNT

Buus: Ja, teknologi management, der gjorde de kimen til noget af det, og det er bestemt et skridt på vejen med det, men det var sådan set, det kom ikke så langt fordi det var sådan noget med, jamen hvis der er nok der vil være med skal vi nok oprette den. Det er jo ikke den måde man udvikler en forretning på. Der kan man sige fra universitetets side skulle man også sige, vi vil udvikle en forretning på det her område, så nu må vi ud, og ikke kun få dem fra

Aalborg, men få dem udefra, for at få det bedre. Det har nok været svært, altså det skal man ikke kimse af, vi prøvede selv på det i Gatehouse hele tiden, prædike at det er altså det forretningsmæssige vi prøver på at lade være driver for det. Fordi det er det der har overlevelseskraften, ikke. Det synes jeg, hele tiden prøve på at spotte, se det forretningsmæssige, spotte mulighederne i det og sådan noget. Vi prøvede det her tiltag med ESA, hvor vi prøvede, det var så mere støttekroner, men alligevel ikke, det var ligesom at prøve at tage det fra den vinkel." (Buus 2010)

Jørgen Hedeved, also explained, that although initiatives were started, by especially Niels Buus, the core of the club was still the technology, the managers in the association supported the initiatives started by Niels Buus but they still had their hearts in the technology:

"... well, it is not, it is not that people did not back Niels, he was really trying to keep the flag high, with a focus on management, a focus on commercialization and creating new business, so there was full support. But, but when it came down to it, then we were most familiar, and that was clearly felt, that if we started, if there was, arose a discussion about technology, if it was this or that technology we should use, then the 'veneration' was much more clear, than when we talked business, well, that was sort of the home field to an engineer, well, the technological, as long as he, and it was mostly a he, as long as the person has not chosen to become a business person. There were some, for example RTX, just to, then I have not mentioned a lot, but just to mention RTX, they ran a business, and it was the engineers who ran the business and the others were also engineers who ran businesses. So of course people ran businesses, but I would say, that technology was where there love was."

"... jamen, det er jo ikke, det er netop ikke sådan at man ikke bakkede op om nu Niels, der prøvede virkelig at holde fanen højt med nu skal vi have fokus på management, vi skal have fokus på at commercialisere og skabe ny forretning, så det var der fuld opbakning til. Men, men når det kom til stykket, så var vi mest hjemmefandt, og det var tydeligt at mærke, at hvis vi gav os til, hvis der kom, opstod en teknologi diskussion om det var den her teknologi der skulle bruges eller en anden teknologi, så var 'veneration' tydeligere end når vi snakkede forretning, altså det var ligesom hjemmebanen for en ingeniør det er alligevel det teknologiske, så længe han vælger, og det var mest han, så længe vedkommende ikke har valgt at være forretningsmenneske. Det var der jo nogle af dem der, altså, RTX eksempelvis, bare for at, så er der en masse der ikke er nævnt, men nu for at nævne RTX, de drev jo forretning, og det var ingeniører der drev forretning, og de andre var også ingeniører der drev forretning. Så selvfølgelig blev der drevet forretning, men jeg vil sige, det teknologiske, det var der kærligheden lå. " (Hedeved 2010)

He also described the reactions of the managers' in the NorCOM association to the discussions on business:

" well, I would say, nod and say yes, yes, that is correct, let us focus on that, and then life went on. So you could say, all you really could say was yes and that is what they did, but I am still waiting to see what they actually did about it. So how did they take the ball and run with it in the different companies. I do not know" (Hedeved 2010)"

"Jamen, altså jeg vil sige, nikke, og sige ja, ja det er helt rigtigt, lad os få fokus på det, og så gik hverdagen jo videre. Altså man kan sige, det kan man jo kun sige ja til, og det gjorde man så også, men jeg har stadigvæk til gode at vide hvad man så gjorde ved det. Altså hvordan tog man bolden op rundt omkring i virksomhederne. Det ved jeg ikke. " (Hedeved 2010)

Here we see a link to the situation in the TIDK case, where the top manager joining TIDK in the last year noticed that people in TIDK had thought about many different ways to position themselves technologically, but never done anything about it, and the days just passed, so to say. I told Hedeved about this aspect of the TIDK case in the interview, and asked if he saw any similarities in relation to what he had experiences in the NorCOM association:

"... That is it, I think that what you are describing comes very close to the truth. That is good, it is of course natural that we should think about business, but if we do not, in the individual company have a practical way of doing it, this increased focus on business, then it is, then all there is left, or just, all that is left is just that we said it was a good idea. That can, that goes without saying, right. And we did not really have anything as an association, well, we talked to the university, can we create something special for this industry. And it did not make much sense other than to say well, NMT is available. Then we could say to the then county and later on to the Vækstforum, well, how about we put some money aside so it becomes easier for companies to give people further education and such, you engaged them on qualifications side. But I cannot point to a concrete grant that came out of it. But that is was an association can do, you could say."

"... Det er jo det, jeg tror det kommer tæt på sandheden, det du beskriver der. Det er en god, det er selvfølgelig helt naturligt at vi skal tænke i forretning, men hvis ikke vi i den enkelte virksomhed har en praktisk måde at gøre det på, det øgede fokus på forretning, så er det, står der jo bare tilbage, eller bare, så står det tilbage at vi har sagt ja til at det er en god ide. Det kan, det siger sig selv, ikke også. Og vi havde ikke rigtigt noget som forening, jo vi sørgede for at snakke med universitetet, kan vi skabe noget som er særligt for den her industri. Og gav jo egentlig ikke ret meget andet mening end at sige jamen NMT er til rådighed. Så kunne vi så sige til, vel det daværende amt, og senere hen til vækstforum, jamen, hvad med at sætte nogle penge af til at det bliver lettere for virksomhederne at sende folk på de forskellige efteruddannelser og sådan, man optog dem på kvalifikationssiden. Men jeg kan ikke lige pege på at der kom en konkret bevilling ud af det. Men altså det er hvad en forening kan gøre, kan man sige." (Hedevang 2010)

So one thing was apparently to discuss and argue that the members needed to be more business minded at a meeting, but it was an entirely different thing to be more business minded in practice. Hedevang noticed in this regard, which is important, that despite the discussions about for example sales, there was a lack of instruments, which could support the discussions in practice:

"But we also talked about selling, thus to emphasize to get a profile, to get some business, some business models on some of it, so, how, it is all good and well, now we know about technology, how do we create business models that create cash flow. How do we sell ourselves. How do we lead companies, things like that. So it was put on the agenda like that. And yes, in that way NorCOM as an association, helped remind the companies, the members, that there is a business side to this. But we never managed to create a lot of instruments to further this as an association. We drew attention to it and Niels, he kept talking about it. And it, in that way got some 'highlight' but it was not something we otherwise did a lot about as an association. That was done, you could not say we did that. Well, there were different activities, then we tried to influence the politicians to do this or that, and we could support a management degree and talked to the University, by the way it was Bent [Dalum] back in the day, and Jens Ove Riis, if we could turn up the management degrees. That was NMT and that is still there, and there, so we both have, we have something and if the companies use it, the university offers the chance to become a better manager."

"Men vi snakkede om at afsætte, altså det at ligge vægt på at få noget profil på, noget forretning på, noget forretningsmodeller på nogle af, altså, hvordan, det er meget godt, nu kan vi det der teknologi, hvordan skaber vi så forretningsmodeller der laver cash flow. Hvordan sælger vi os. Hvordan leder vi virksomheder, sådan nogle. Altså det blev ligesom stillet på dagsordenen på den måde, Og, ja på den måde så var NorCOM jo som forening med til at minde virksomhederne, medlemmer, om at der er altså en forretningsside her. Men vi fik aldrig en masse instrumenter etableret til at fremme det som forening. Vi gjorde opmærksom på det, og Niels han blev ved med at snakke om det, Og det, altså på den måde fik det noget highlight, men det var jo ikke noget vi sådan ellers gjorde noget ved som forening. Det gjorde, det kan man ikke sige vi gjorde. Jamen der var jo forskellige tiltag, så prøvede man at påvirke politikerne med at vi kunne gøre sådan og sådan, og vi kunne støtte en lederuddannelse og

snakke med universitetet, i øvrigt Bent i sin tid, om, og Jens Ove Riis om, kunne vi skrue op for noget på lederuddannelse. Der var så NMT, og det er der jo så stadigvæk, og der, så altså vi har både, vi har noget, og hvis virksomhederne benytter sig af det har universitetet sådan set tilbuddet om at blive en dygtigere leder.” (Hedevang 2010)

The technological focus was present all the way to the end of the story, as Jesper Jespersen explained:

”What you should, generally, you have been after it, that is that whether we talk about NorCOM or we talk about some of the new companies in engineering medicine or whatever we should call it, that is that they are still, they are still very technically grounded. And they are established on the basis of transfer of technology, cooperation with the university, or transfer of technology and then continue to be prototype developers or whatever, that continues to develop, then we will again lack, what should we call it, these complete companies. Where you got to have the disciplines, if you start from the top, the administration, right, management, crisscrossing, a CEO is not necessary in these companies, you just need a HR executive, right, to pay salaries, then you built companies, you have more traditional company structures, where you have general management, something called market, marketing, sales, development, production, administration and human resources etc. etc. So you get all of the additional things. Also to run. That is where it is, that is how you survive in the long run, if you need to keep a high level of knowledge, then you need the other types too, right. They need jobs too, where would they otherwise go, couples where one is a lawyer or knows something about marketing. There are no jobs to get in marketing. Like I think I told you once, back when we established Sonofon, marketing people they could not be bothered going to Aalborg, right. And it is usually those kinds of top-notch marketing people that we had, because we need to beat a monopoly that had all the rights to something called Tele Danmark or TDC, so we built a major office in Copenhagen and the first people to leave were the marketing people. They would rather work in Frederiksberg, right. And that is the image you have. Where are all the companies in Denmark placed, if you look beyond a few big ones, like Lego, Danfoss og Grundfos, that all need something.” (Jespersen, 2010)

”Det man nok skal, altså sådan generelt, du har været efter det, det er jo at uanset om vi snakker NorCOM eller vi snakker nogle af de måske nye virksomheder indenfor ingeniør medicin eller hvad vi nu skal kalde det, det er jo nok at de bliver meget, de stadigvæk er meget teknik funderede. Og bliver etableret på grundlag af noget teknologi overførsel, samarbejde med universitetet, eller teknologioverførsel og så fortsætter med at være prototype udviklere, eller hvad du nu skal sige, som fortsætter med at udvikle, så vi igen kommer til at mangle, hvad skal vi sige, de hele virksomheder. Hvor man er nødt til at have disciplinerne ind, altså starter oppe fra administration ikke, ledelse, på kryds og tværs, administrerende direktør har man jo ikke behov for i de virksomheder, du skal jo bare have en personaleledende, ikke, til at udbetale lønningerne, at man så får bygget virksomheder, ligesom siger, man har de mere traditionelle virksomheds opbygninger, man har altså noget der hedder generel ledelse, noget der hedder markeds, marketing, salg, udvikling, produktion, administration, og human resources osv. Osv. Så vi ligesom får de øvrige ting. Også at stå med. Det er jo det der er, det er jo det der skal være overlevelsen på sigt kan man sige, fordi hvis man skal holde et højt vidensniveau, så skal der også være plads til de andre typer, ikke. De skal altså også have nogle jobs, for hvor skal de ellers gå hen, mand og kone hvor den ene er jurist eller kan noget om marketing. Der er jo ikke et job at få som marketing vel. Som jeg tror jeg sagde til dig, dengang vi etablerede Sonofon, marketing folkene de gad sku ikke rejse til Aalborg vel. Og det er typisk de der top-notch marketingsfolk som man havde, fordi vi skulle have tæsket et monopol der havde rettighederne til alting der hed Tele Danmark dengang, eller TDC, da vi ligesom, så byggede vi et stort kontor i København, og de første der rejste til København, det var marketing folkene. De ville hellere sidde derovre på Frederiksberg, ikke. Og det er jo det billede man har ikke. Hvor sidder alle de der virksomheder i Danmark, hvis man ser bort fra de store ikke, Lego og Grundfos og Danfoss som alle sammen har behov for noget.” (Jespersen 2010)

This was also supported by Niels Buus, who added however, that because of the situation in the cluster in the late 2000s, where a number of closures occurred, which I will present in more detail later, the focus on business had maybe become stronger:

”Buus: ...Out of necessity it has probably come now, because they have pulled out, but that is further down the history, right. I hope it is emerging; I am not that close to it now. But the success was confirmed to many, there was many people who had created small companies that had been bought by big ones and they made a lot of money from it. And during the time, I was also part of Gatehouse, there was a mindset, that the part about getting customers and a business, that does not mean so much, as long as we had a set of competencies, because then somebody would come along and buy us. And that was hard to argue against, because there were some good success stories. From that period, you can see that there are articles where I said that we were sitting on top of goldmines etc. that might have been a bit exaggerated but I still think so to this day. That the commercial side was seriously missing. And the reason for that, if I may, is that a company can be owned and based on foreign capital, what is the core, is to have a grip on the business and the customers. Because then you own, if that is here, then it is harder to move, because then you are close personal relations and that is something which is closer to where the money is made, or created. But here the focus was on the technical, and then you suddenly become the development companies for other companies around the world, and I have said this a lot, from platforms and in news papers and in all those speeches, etc, that the future of our jobs are determined by Headquarters around the world. And they can close [snaps his fingers] just like that. And that is what happened. And I have also mentioned several times that we ought to, for example I remember from London Business School, there we were sitting around looking at the next management challenges, where are our management challenges so we can create more value. But at, I cannot remember what they are called the faculties, but the one you come from, the one Bent was from...

Reinau: Business studies and social sciences

Buus: Yes, Business studies, there, as far as I can see, nobody from business studies have seen that we have a huge opportunity here, because we have some of the world's best technical competencies, we need to help getting them into play. That is what you do in Business, and in a lot of other business schools around the world, they would look at it and do it, and I have also mentioned before that I think a, you have the opportunity to create a high profile MBA, an MBA with the original purpose, to make engineers think business.” (Buus 2010)

”Buus: ...Af nød er det nok ved at komme nu, fordi de har trukket sig ud, men det er så senere i historien ikke. Jeg håber det er ved at komme, det er jeg ikke så tæt på nu. Men succesen var jo også bekræftet for mange, for der var jo mange der havde lavet små virksomheder som var blevet købt af store virksomheder, og de tjente en masse penge på det. Og i den tid, jeg var også i Gatehouse, der var tanketemaet, at det der med om vi har fat i nogle kunder og har noget forretning, det betyder ikke så meget, bare vi har nogle kompetencer, for så skal der nok komme nogle og købe os. Og det var svært at argumentere imod, for der var nogle gode succeshistorier. Fra den tid kan du også set at der er nogle avisartikler hvor jeg siger at vi sidder på nogle guldgrupper osv, det er lidt flot udtalt, men det mener jeg stadig den dag i dag. At den kommercielle side af det den manglede i alvorlig grad. Og grunden til det er, hvis jeg må, at en virksomhed kan godt ejes, være baseret på udenlandsk kapital, det der er kernen det er at have fat i forretningen og kunderne. Fordi så ejer man, hvis det er her det er, så, det er svære at flytte, fordi den, det er noget der er tættere på personlige relationer og det er noget der er tættere på hvor pengene de laves, eller skabes. Men her fokuserer man på det tekniske, og så bliver man lige pludselig udviklingshuse for virksomheder rundt omkring, og jeg har sagt en masse gange, både fra talerstole og i aviser, og i alle de snakke osv., at vores arbejdspladsers fremtid de er bestemt af hovedkvarterer rundt omkring i verden. Og de kan lukke (Knipser) bare sådan her. Og det er også det der er sket. Og jeg har også nævnt flere gange at man burde lave, f.eks. så kan jeg huske fra London Business School, der sad vi og kikke på hvor er de næste ledelsesudfordringer, hvor er vores ledelsesudfordringer for at vi

kan være med til at skabe mere værdi. Men på, jeg ved ikke hvad de hedder de institutter, men bla. Det er nok der hvor du kommer fra, der hvor Bent kommer fra

K: Erhvervsstudier og Samfundsfag

N: Ja erhvervsstudier, der, så vidt jeg kan se er der ingen af erhvervsstudierne der har set, at vi har en kæmpe opportunity her fordi vi har nogle af verdens bedste kompetencer på det tekniske, vi skal hjælpe med at få det sat i spil. Det vil man på enhver, på mange andre forretningsskoler rundt omkring i verden, det vil man kikke på og gøre, og jeg har også nævnt nogle gange, at jeg synes der skal laves en, man havde muligheden for at lave en højt profileret MBA, en MBA med det formål som MBA oprindeligt var lavet for, nemlig at få ingeniører til at kunne tænke forretningsmæssigt." (Buus 2010)

I have now argued that managers in NorCOM tried to put business competences on the agenda, and tried to strengthen the focus on business in the association over the years. However, despite some advances, the need for business competences mainly remained a recurring discussion in the NorCOM association, while the focus and the interest of the members stayed on the technology.

It necessary to underline that it would be wrong to argue that there were no interests in business in the NorCOM organization. It was a business organization consisting of companies, but, and this is the important 'but'; of these companies only few were 'whole' companies, the majority were R&D companies, or R&D subsidiaries, and this had important implications for the way in which the notion of business and marketing was constructed in the organization.

Some of the companies did see the need for business competences, and these were local companies, such as AM3D, RTX Telecom and Gatehouse. But there were not enough momentum among these companies to really change the focus in the NorCOM association, according to Niels Buus:

"Buus: Well, the ones that faced this problem, they supported it. What was it called, Sven Vester-gaard in AM3D definitely thought in that direction too, and there were others, RTX thought in that direction too. And I think, I do not know now, but, they probably still do now, think in that direction, and there were other of the independent companies that did it. But there just was not enough, there was not inertia in it, well, there should have been a bit more, we should, I do not know why not, but the situation just was not to it, either..

Reinau: Does that mean that you were still resting on the laurels from the early 90's?

Buus: You could say that, yes, somewhere, because it was a success. It was a success and what they did was right, and there was still a bit of the mentality, that if you could just create a good development department then somebody would come and buy it."

"Buus: Jamen dem der havde problemstillingen gav det her jo også opbakning ved. Hvad hedder det, Sven Vestergaard i AM3D tænker da helt klart i den retning også, og der var også andre, RTX tænkte også i den retning. Og jeg tænker, jeg ved ikke nu, men altså, det gør de nok også nu, tænker i den retning, og der var da andre af de der selvstændige virksomheder som gjorde det. Men der var bare ikke nok, der var ikke inerti i det, altså, det skulle ligesom være lidt mere, vi skulle, jeg ved ikke hvorfor den ikke, men situationen var der ikke til det, enten som

Reinau: Vil det sige man stadig hvilede på laurbær bladende lidt fra starten af 90'erne

Buus: Det kan man, ja, altså et eller andet sted, fordi det var jo en succes. Det var succes og det de gjorde var rigtigt, og der var stadig lidt af den tankegang med at hvis man bare kan lave en god udviklingsafdeling, så kommer der nogle og køber den." (Buus 2010)

As can be seen from the quote, this comes back to the issue discussed earlier in relation to Rauff and Sørensen, the success advice in the cluster, given the growth and the number of acquisitions in the late 1990s, was to create an R&D company and be acquired by an MNC. And this in turn meant, that business capabilities were only secondary, what mattered the most was the technological competence.

Hedevang made the point, that the issue of technological competences versus business competences should not be understood as one or the other being more important, but rather that both were important. Given that the field was wireless technology, the companies needed wireless competences to survive:

"The technology base is a necessity, that is indisputable, if you want any kind of legitimacy to trade in this field that we are talking about, wireless technology, it is first and foremost wireless telecommunications we are talking about, then the technology needs to be in place. It needs to be able to do something, and it needs to be just cutting edge enough, and it has to measure up to other research and development centers around the world, I do not think this is debatable..."

"Teknologibasen er jo en nødvendighed, altså det står ikke til diskussion, at hvis man skal nogen berettigelse i at handle med noget i det felt vi taler om, trådløs teknologi, det er jo først og fremmest den trådløse telekommunikation vi snakker om, jamen så skal det jo være i orden. Så skal det kunne noget, så skal det være i tilpas omfang på forkant ikke også, og kunne måle sig med andre forsknings udviklings centre i verden, det synes jeg ikke står til diskussion...." (Hedevang 2010)

The business competences were also necessary, and Hedevang explained that the issue was, that if companies before being acquired by MNCs possessed both the technological competence and the business competence, then they would also have competences to play the necessary business games within the MNCs:

"... and if you do not in the local, how to say this, in the Nord Jutland owned or Danish owned, time of a company's history do not have the understanding that there is both business and management, politics and technology, well then you could say, that the moment you are bought by a major player, with lots of locations around the world, because they want to have their finger on the pulse, where can we get our hands on the technology, so they are just buying departments at all the interesting research institutions, in these environments, there is a clear pattern, a global patterns, that is what they do, because then they are in charge. And that is natural, when you have, are those kinds of players, right. Then there is nobody in, we could take TI or we could take somebody else, of the others, then there is not anybody to play, what should we call it, the commercial, the management or the political card, because then you are a technology hub as a part of a larger one, and then you really just need to play the internal company game to stay in the game, and that also easily becomes about how we have the most cost efficient, technological advanced and quality solution, then as you said earlier, we thought we were in the game. Then we are part of the game when the next project comes around or the next time a project is created. And then we will probably get our fair share. And that is how it went a lot of the time, until there was a capacity situation where it was possible to cut certain locations away. And then Northern Jutland was a pretty small in some of the big companies, right." (Hedevang 2010)

"... og hvis ikke du lokalt, hvad skal man sige, i den nordjysk ejede eller dansk ejede, tid af en virksomheds historie har den der forståelse af at det er både forretning og management, politik og teknologi, jamen så kan man sige, i det øjeblik du så bliver købt op af en stor spiller, som har mange lokationer rundt omkring i verden, fordi de vil have fingeren på pulsen, med hvor kan vi få fingrene i teknologien henne, så de køber jo egentlig bare afdelinger op ved alle de interessante forsknings institutioner, i de miljøer, det er jo et tydeligt mønster, globalt mønster, at det gør de, fordi så har de fod på det. Og det er jo da naturligt når man har, er så-

dan nogle spillere ikke. Så er der jo heller ingen til i den, vi kan tage TI eller vi kan tage hvem nu det er, af de andre, så er der jo ingen til at spille hvad skal vi sige, det kommercielle, det ledelsesmæssige, det politiske kort, fordi så er du jo en teknologi hub som en del af en større, og så skal du egentlig bare spille det interne concern spil om at holde dig til, og der bliver den også let den der med at hvis vi har de mest cost effektive og teknologimæssige, teknologiske, hvad skal vi sige, kvalitetsbetonede løsninger, og til tiden som du sagde, så regner vi med at vi er med. Så er vi en del af gamet næste gang der skal udgives et projekt, eller næste gang et projekt skal etableres. Og så får vi nok vores passende andel. Og sådan gik det jo også mange gange, indtil der var en kapacitets situation hvor man sagtens kunne skære nogle af de der forskellige steder væk. Og havde rimeligt rundt omkring i verden. Så var Nordjylland meget lille viste det sig i nogle af de store huse ikke.” (Hedevang 2010)

He continued:

”And there was nobody to take the political management case, because that necessity was not there or nobody had seen it, you could say. Or were able to do it, because now you were part of a large international company and those, then there was RTX which was independently Danish owned, and I cannot list the others, but they were of a size and type where there were no great, how to say it, business minds or charismatic business leaders, but that were run by extremely talented engineers, that had these companies and then it became a bit, like you say through your way of asking, they lacked the management section. That was what Niels and a lot of others could see, and that is why it because a theme that was highlighted also in the association. But as we did a little as an association, it did a little here and there, point to, was part of a dialogue with Jens Ove and Bent if we could do something special in the management training, dialogue with Vækstforum, and what came before that, about funding for developing competencies in that area. And we held, what should I call them, meetings for members where, where people who were interested in created business models for technology, technological competencies, they gave talks. We also did things like that in the association.”

”Og der var ingen til at tage den der politiske managementmæssige sag fordi den nødvendighed var der jo ikke, eller der var ikke nogen der havde set den kan man sige. Eller kunne varetage den fordi du var en del af en stor international spiller, og de der, så var der RTX som selvstændig dansk ejet, og jeg kan som ikke lige side og remse de andre op, men de var så af en størrelse og en type hvor det ikke var store, hvad skal man sige, forretningstalenter eller karismatiske forretningsleder, men det var knalddygtige ingeniører der havde de virksomheder og så blev det lidt, som du jo også på din måde at spørger på siger, så kom det til at mangle det der managementled. Det var der Niels og det var der mange andre som godt kunne se, og derfor blev det et tema der blev highlightet også i foreningsregi. Men altså vi gjorde sådan lidt som forening, forening gjort lidt her og der, pege på, indgik i noget dialog med Jens-Ove og Bent om vi kunne gøre noget særligt på lederuddannelsen, dialog med vækstforum og hvad der var tidligere om kan der komme noget funding til noget kompetenceudvikling på det. Og der blev også holdt, hvad skal jeg sige, medlemsmøder hvor, hvor sådan nogle der var optaget af at skabe forretningsmodeller på teknologi, teknologiske kompetencer de var foredragsholdere, sådan noget gjorde vi også i foreningsregi.” (Hedevang 2010)

So a picture emerges from the interviews that the business competences were lacking in the companies. Talented engineers in the words of Hedevang in the quote above ran the companies, and the recipe for success was to make an R&D company and be acquired by an MNC. And in a way, this was also reflected in the content of the cooperation in the NorCOM association, which according to Niels Buus never got beyond the level of technology platform development. The association never did business together.

”Buus: ...you could say that it is one element to create the technological platform, that is not it, but if the companies do not do business with each other and are in a network, and try to unite, then you do not have a cluster. So, just being a club where you meet because you have

common interests or because you are from the same area, have the same subject, etc. That has nothing to do with a cluster, in my opinion, and that is what NorCOM has been. NorCOM has never worked together to try and win an order as a unit.

Reinau: Alright, not in connection with research projects at the university or something?

Buus: Well, yes, but that is not business, that is development of competencies. Development of competencies. First layer, that has to do with the workers/employees, that is the basis, the next layer has to do with development of competencies, the next layer is creating the platform together, we have never ever got to doing business together. There are a very few isolated examples of companies which have worked together to get an order."

"Buus: ... man kan godt sige at det er et element at lave teknologiplatformen, det er ikke det, men hvis ikke virksomhederne de laver forretning sammen og i netværk, og prøver på at stå sammen, så har man ikke et cluster. Altså, det der med at have en klub hvor man mødes fordi man har ting til fælles, eller fordi man kommer fra det samme område og har det samme fag osv. Det har ikke noget med et cluster at gøre, efter min opfattelse, og det er det NorCOM har været. NorCOM har aldrig nogensinde arbejdet sammen om at prøve på at vinde en ordre i fællesskab.

Reinau: Ok, heller ikke i forskningsprojekter for universitetet og sådan noget.

Buus: Jo men det er jo ikke forretning, det er kompetenceudvikling. Kompetenceudvikling. Første lag, det er med arbejderne, det er det helt basale, det næste lag, det er at lave noget kompetenceudvikling, det næste lag det er at lave noget platform sammen, vi er aldrig nogensinde nået op og lave forretning sammen. Det er meget meget enkeltstående tilfælde at virksomhederne de er gået sammen om at vinde en ordre sammen." (Buus 2010)

The reason for this was that the technological development along with the MNC acquisitions and the consolidation in the industry meant that over time people in the NorCOM association had less and less to cooperate on seen from a business perspective. This also explains why the only things the NorCOM association did united were initiatives such as the international school, as I will return to later, because initiatives like this was the only things they could find a common ground on.

"Well, then you could say, that there [points to sketch] there was a couple of companies or three that were all really owned up here, they had a good, all the way back to Dancall etc. The had a good reason to create a technology platform together. The moment it becomes internationally owned development department, then they have little interest in even doing a technology platform together, because they are so large they begin to go their own ways with those things, and to make their own platforms for their number of mobile phones but also have found a competitive advantage from their corner of the world, right. So, when you get there, here, when you get there, the reason to do business together, that has long gone, because they are in each their different country. So is the reason for doing competence development and common technological platforms also that is also gone. And then it is more about these people who are all here, they know each other, and they want a community and a club where they can sit and talk. And I can tell you that, from year to year we occasionally had to go through, what do you call it, discussions, because not all of the people in the association could convince their head quarters that they should spend money remaining a member of NorCOM. And then we would talk about, how about we do some recruitment exercises together etc. etc. then it would be wise to be involved, if that is how we recruit employees. But as time passed it became more and more difficult. So that, your hypothesis there, that is completely true. That the reason to stay together that disappeared. And if NorCOM at an earlier point had said, right, we will open up to IT, it could have been the more technological part of IT, then you could have signaled from the inside that we are open to the direction the world is moving in, where it was not only communication, communication was a part of it, but there was much more. And maybe open up for creating products that more belonged in

the area. And that was a tactical error from NorCOM, and it was a tactical error that we organizationally did not get these competencies into play in my opinion.”

“Jamen så kan man sige, at derhenne [peger på skitse], der var der et par firmaer eller 3 som egentlig alle var ejet heroppe, de havde jo en god, altså helt tilbage til Dancall osv. De har en god grund til at lave en teknologiplatform sammen. I det øjeblik det bliver international ejet udviklingsafdelinger, så har de ikke engang en interesse i at lave en teknologiplatform sammen, fordi de er så store at de begynder at gå deres egne veje med de ting, og lave deres egne platforme til deres antal af mobiltelefoner, men også at have fundet en konkurrencefordel fra hver deres hjørne af verden, ikke. Så når man kommer derhen, herhenne, når man kommer derhen, så er årsagen til at lave forretning sammen, den er forsvundet for længst, fordi de sidder i hver deres lande dem der. Der er årsagen til at lave kompetence udvikling og fælles teknologi platforme, der er den også væk. Og så er det mere fordi de mennesker som hver især sidder i de her, de kender hinanden, og gerne vil have et fællesskab, og gerne vil have en klub hvor de sidder og snakker i. Og jeg kan godt sige dig, at fra år til år måtte vi engang imellem igennem nogle, hvad hedder det, diskussioner, fordi det var ikke alle de mennesker der sad der, der kunne overbevise deres hovedkvarter om at de skulle bruge pengene på at være medlem af NorCOM. Og så var man lidt inde i, jamen hvis vi nu laver nogle rekrutterings øvelser sammen, osv osv. Sammen, så er det nok klogt at være med, hvis det er sådan at vi kan få medarbejdere. Men ligesom tiden gik blev det sværere og sværere. Så det, din tese i det, den er helt rigtig. At grunden til at være sammen, den forsvandt. Og hvis NorCOM på et tidligere tidspunkt havde sagt, jamen nu åbner vi op for IT, så kunne det være lidt mere teknologidelen af IT, så har man også der indefra åbnet sig for at nu er verden på vej ind i noget nyt, hvor at det ikke kun var kommunikation, kommunikation var en del af den, men det kunne være meget mere andet. Og måske åbne op for at man kunne begynde at lave mere produkter som hører til i området. Og det var en taktisk fejl fra NorCOM, og det var også en taktisk fejl, at man organisatorisk ikke var med til at få sat de her kompetencer i spil efter min opfattelse.” (Buus 2010)

Niels Buus further argued, that in his view, the train was missed by the cluster when the boarder to the IT environment were sealed off in the late 90s. Because if these links had been established, they would have opened up several business opportunities. But instead a wall towards the IT environment were erected, leaving people in NorCOM only the opportunity to do technological platform development together, something they never took as far as to do business together.

“Well, that was some of what I have told here, then it become more, there was not anybody who thought that that it was not a good idea to look more at business, than at, but because the steps to open up had not been taken, then, then we were at the beginning of the last act, to say it plainly. And again, if we want to go back, and do business together, and we looked at the business side. I think that is it great to develop competencies together. And it is great to do platforms together; it just is not always easier to make it work. But if you really want it up and running, then you need to be at the point where you talk business. Because, that is where the money is, that is the blood in this. If we are not in a place where we take part in making money for the company and not just spend money, because development departments they only spend money, they are on grants, if we are in a place where we can help make money, then we have a chance to live. We have never been able to do. We have never been there.”

“Jamen det var sådan set noget af det jeg fortalte her, at så blev det mere til, der var ingen der syntes at det ikke var i orden at prøve at kikke mere forretning end på det, men fordi de der skridt til at åbne op de ikke var taget, så var, så var begyndelsen på sidste akt, den var startet, for at sige det rent ud. Og igen, hvis vi vil tilbage, og vil lave forretning sammen, og vi kikkede på det forretningsmæssige. Jeg har det sådan, at det er fint nok at lave kompetenceudvikling sammen. Det er fint nok at lave platforme sammen, der bare ikke nemt altid at få det til at køre. Men hvis det rigtigt skal op og køre, så skal det være derhenne hvor vi snakker forretning. Fordi, det er det der giver pengene, det er blodet i det her. Hvis ikke vi er der hvor vi kan være med til at lave penge for virksomheden, og ikke kun bruge penge, for udviklingsafdelinger de bruger jo kun penge, de er på bevillinger, hvis vi er derhenne hvor vi kan være

med til at skabe indtægter, så har vi en chance for at kunne leve. Det har vi aldrig kunne. Der har vi aldrig været.” (Buus 2010)

Hindering the development of technological competences among members of NorCOM was the fact that most were part of MNCs, as Niels Buus explained:

“... they are not allow to give secrets to each other. And if you try to take these drawings here, if you have them here, which is in the cluster here in Aalborg, right, then it will go out to HQ here, and HQ there, and there and there. And they, they think of each other, because they are in more or less the same business, they consider each other their main competitors. How exactly should people here in Aalborg be able to argue that it would be wise to start telling stuff to other companies, they would never be allowed to do that by them out there. So the level of communication about the real content was very very low. It became very, very low. At a point, when you get to that point, then the chance to do more than basic education and basic competencies development has been missed, because they do not want to be part of it. Back when it was Dancall, and it was, what was their name again, they were all here, and they all knew each other, the managers knew each other, then it could be done. Back then they could make projects together. These, they need to get permission, and then them out here in the global [i.e. the HQ's], they need to make a project together. And if there is a common project, it is not certain it goes to Aalborg at all.”

“... de må jo ikke have lov til at give hemmeligheder til hinanden. Og hvis du prøver at tage tegningen nu her, hvis du har dem her, som er klyngen her i Aalborg ikke, så går det ud til HQ der, det går ud til HQ der, det går ud til HQ der, det går ud til HQ der. De der, de betragter hinanden, fordi det er jo indenfor stort set den samme branche, de betragter hinanden som hovedkonkurrenter. Hvordan var det lige at dem her i Aalborg området de skulle argumentere for at det vil være klogt at begynde at fortælle et eller andet på tværs her, det ville de aldrig nogensinde få lov til for dem herude. Så kommunikationsniveauet, om det virkelige indhold, det var meget meget lavt. Det gik hen og blev meget meget lavt. På det tidspunkt, når det er kommet dertil, så er det forpasset at lave andet end basis uddannelse, basis kompetence udvikling, fordi det vil de ikke være med til. Den gang det var Dancall og det var, hvad var det nu de hed, de sad her jo alle sammen, de kendte hinanden, cheferne kendte hinanden, der kunne det lade sig gøre. Fordi der kunne de stille en fælles opgave. For dem her de skal have lov, så skal dem her ude i international [dvs. HQs], så skal de have stillet sig selv en fælles opgave. Og hvis de har stillet sig en fælles opgave, så er det ikke sikkert at det er i Aalborg et kommer til at ske.” (Buus 2010)

Similarly, Gjerrild explained that because of the competition between the MNCs it was not possible to cooperate at a technological level either.

” Yes, definitely, yes, yes. In a way it does, right, but what you could draw on each other for, we never did, because that was part of the competition, when it got so specific. Because what you could draw on each other for, that is more fundamental technologies. Like, well CMM or something. Who are the good course providers or what are the new trends in mobile communication, how these technologies they fit in. Those were thing you could draw on each other for. Maybe we could also, well, at a more grassroots’ level, occasionally people ran into problems, they could not get their hands on a particular component. And then it could be that some engineers knew that somebody else probably made that, and then we’ll just call, do you have one of these, can I borrow it, of course. That happened, not a lot, but occasionally. That people helped each other out at that level. But experiences with how to sell a company, how do we sell the local area, internally in our own company, so that we attract more projects, that was not something we spent energy helping each other with”

”Jo, helt afgjort, jo, jo. På en måde gør det jo altså, men det man kunne trække på hinanden om det har vi aldrig gjort, for det var jo konkurrence belagt, altså når det blev så specifikt. Fordi det man kunne trække på hinanden om, det er mere grundlæggende teknologier. Så som, altså CMM eller sammen noget. Hvem er de gode kursusudbydere eller hvad er trenden

indenfor mobil kommunikation, hvordan, de her teknologier, hvordan kommer de ind. Det kunne man trække på hinanden på. Måske kunne vi også, altså, det foregik jo sådan lidt nede i græsrodshøjde, det her med, en gang imellem kunne man jo løbe i et problem, at man ikke kunne skaffe en eller anden komponent. Og så kunne der jo godt være nogle ingeniører som vidste at det lavede de vist også ovre ved, og så ringede vi lige over til, har du sådan en, kan jeg låne sådan en, det kunne man godt. Det skete da, ikke ret meget, men lidt. Altså sådan at man hjalp hinanden på det niveau der. Men erfaringen med, det der med hvordan sælger vi virksomheden, hvordan sælger vi lokalområdet, internt i vores egen koncern sådan at vi får tiltrukket flere opgaver, det brugte vi energi på at hjælpe hinanden med.” (Gjerrild 2010)

Given that the members had little technology or business to talk about, one could go as far as to argue, provocatively, that over the years it turned into a coffee club for old friends:

“It might be a bit harsh to call it a coffee club, but if you are at the point where you want to be very provocative, then it is not completely untrue. Because, it was very, very difficult, it was, you could, it was a great place to talk to people, and it was a great place to talk about the business, etc. and it was a good place to get a bit of inspiration when one of the super entrepreneurs came and held a speech, but there was not anything for the business. What we could use it for in Gatehouse that was for our first slide, when we went into the world and we were nothing at the time, when we went into the world, then we could mention, then we could without having to ask for permission put Siemens, Nokia, Ericsson, RTX etc. and say we are in the same club, we are with them, and there are so and so many jobs in Northern Jutland and at one point I was the chairman for the association, and could say, well, I am the chairman of this industrial organization that is there, right. That went a long way in the world. That was something we could use at a spring board, it gave certain credibility. But it was somewhere, and it might be a bit naughty to say, I will just say it straight up, it was more about using the situation than contributing to it. And you could say that, nicely put we supported each other in that way, right. But that was not something the big ones could use for anything. And that is why I say that they really used resources to convince their head quarters to even let them remain members”

“Det er måske lidt hårdt at kalde det en kaffeklub, men hvis man er derhenne hvor man godt vil provokere rigtigt meget, så er det ikke helt løgn. Fordi, det var meget meget svært, det var, man kunne, det var et godt sted at få folk i tale og det var et godt sted at snakke om ens branche osv., og det var et godt sted at få lidt inspiration til at når der kom en af de der super iværksættere og prøvede at holde nogle taler, men det var jo ikke noget for forretningen. Det vi kunne bruge det til i Gatehouse, det var at på vores første slide, nu når vi skulle ud i verden, og vi var ingenting på det tidspunkt, når vi skulle ud i verden, så kunne vi nævne, så kunne vi uden at vi skulle spørge om lov sætte Siemens, Nokia Ericsson RTX osv, og sige vi er i den klub, vi er med i dem, og der er ca. Så og så mange arbejdspladser i Nordjylland, og på et tidspunkt var jeg formand for det og kunne sige, jamne jeg er formand for den industriorganisation der er det der, ikke også. Det var noget der gjorde sig ude i verden. Det var noget vi kunne bruge til at afsætte med, det gav en vis troværdighed. Men det var, et eller andet sted er det mere lidt frækt, jeg siger det lige ud, det var jo mere med at udnytte situationen end at bidrage til situationen. Og der man kan sige, man kan også pænt sige at man støttede hinanden på den måde, ikke. Men det var ikke noget nogen af de store kunne bruge til noget. Og det var også derfor jeg siger, de skulle altså bruge ressourcer på at overtale deres hovedkvarterer om at de overhovedet skulle blive ved med at være medlem.” (Buus 2010)

This also meant that what the MNCs affiliates got out of their membership was mainly the personal network with other CEOs, and the initiatives by NorCOM to attract engineers to the region. Towards the last years these initiatives by NorCOM to attract engineers were also something which helped managers in MNC affiliates to argue to headquarters that membership was a necessity, and as such they had a double goal, they made it possible for the subsidiary managers to stay members of the NorCOM association and they attracted engineers.

In the last years the organization's membership declined and the reasons for this were amongst others exactly this issue, that it became increasingly difficult for managers in MNC affiliates to sell the idea of membership to their headquarter:

"Some of them had the issue that they could not get money from somebody far away; that they had to reason with. And then there were some who wanted to be a member, who could not become a member. And yes others, I am not so sure about. There were a few, but exactly why they were not members. There were more and more, who were not [members]. At one point Sonofon left, because they had moved somewhere else, and something along those lines. So there were some of them that were smaller development departments for the big international [companies]. We got somebody up and then it was kind of like that some, a few began to fall away again"

"Nogle af dem var det jo det at de kunne ikke få lov til at bruge penge fra nogle som var langt væk, som de skulle argumentere overfor det. Og der var nogle, så var der nogle der godt ville være medlem som ikke kunne blive medlem. Og, ja andre, det ved jeg ikke umiddelbart. Der var nogle enkelte, men lige den dybere årsag til de ikke var der. Der var flere og flere som ikke var det. På et tidspunkt gik Sonofon ud, og, fordi nu var det flyttet et andet sted hen, og sådan noget i den stil der. Altså der var nogle af dem som var de mindre udviklingsenheder for de store internationale. Vi fik nogle op, og så var det ligesom at nogle begyndte, nogle få begyndte at falde lidt af igen." (Buus 2010)

Niels Buus therefore also argues that the event, which has had the largest influence on the development of NorCOM, was an event that never took place: an early opening up towards the IT industry and other industries:

"Well, somehow, I will almost say that the most important thing was probably that we did not make any of the decisions that would have opened it up. Because, I believe, that if we had been able to, if we had been involved in opening up, that would also have been, that would also have been an element in opening up businesswise. So if that could have been done then that would have been a signal to also open up businesswise. I think there is, I believe there is a close connection between how we in NorCOM did not open up, and how the industry did not open up. It is kind of the same petrified thing that closed down the development departments etc. right."

"Jamen et eller andet sted vil jeg næste sige at det vigtigste det var, at vi ikke fik truffet nogle af de beslutninger der gjorde at det skulle have det åbnet op. Altså fordi, jeg tror på, at hvis vi kunne, hvis vi kunne ligesom have været med til at åbne op, det vil også være, det ville også have været et element til at man ville åbne sig lidt op forretningsmæssigt. Altså hvis det kunne have været gjort, så ville det have været signal til også at åbne op forretningsmæssigt. Jeg synes der er en, jeg synes der er en nøje sammenhæng med at vi i NorCOM ikke åbnede os op, en nøje sammenhæng med at man som branche ikke fik åbnet sig op. Det var egentlig den samme lidt forstenede ting, som gjorde at de her udviklingsafdelinger lukkede, og så videre. Ikke." (Buus 2010)

So if we accept the point made by Niels Buus, that beginning of the end occurred in the late 1990s, because the NorCOM association did not open up towards other environments such as IT and pursued different business possibilities there, and the members got increasingly less business opportunities to talk about, and found it increasingly difficult to cooperate at a technological level, what did then unite the association in the last years of its existence? This the data show, was a struggle against other institutions and organizations for the opportunity to raise the technological level in the region further. Let me elaborate a bit upon this. The companies could not do technology development together, because of competition issues, but they were united on two things. Firstly, the initiatives to support the wireless competences at AAU, which in turn would make the competence profile of the cluster stronger, and thereby support the managers'

position within the MNCs, and make it easier to argue for the importance of a subsidiary in the NorCOM cluster. Secondly, they could unite in a struggle to attract and keep talented engineers in the region, and thereby also strengthen their own access to workers. And this was what united the association in the last years.

How did the focus on raising the technological level in the region and on attracting engineers fit with the relatively low interest in business competences? The situation was that there from the DC Development phase was a relatively strong sense of unity among people in the NorCOM cluster. There was an 'us' created around the technological success DC Development experienced in telecommunication. Competences thus became the only focus, and regarding the DC Development history and the acquisitions, people in the cluster actually only talked about half of the story, which was the technological success. The business side was left relatively untold. Niels Buus argued:

"... in a way you could say that we only told ourselves half the story. We only told the story of how we had good competencies, we did not tell each other whether they were needed too, and that is why, yes, then we continued..."

"... på den måde kan man sige, vi fortalte kun os selv halvdelen af historien. Vi fortalte kun den historie at vi var gode til kompetencerne, vi fortalte ikke hinanden om der var brug for dem også, og derfor ja, så fortsatte vi..." (Buus 2010)

He took the argument as far as to argue that this unity in wireless technology, and being the best technologically, was actually what made the cluster "drive to its death", because it meant that people in the NorCOM association did not want to open up towards other industries and pursue different business opportunities in cooperation with these fields:

"Buus: ... there was, I think there was a major common culture amongst the companies on that specific point.

Reinau: Ok, can you elaborate on that, how,

Buus: Well, exactly as you said, and I think if you, if you went over to Motorola, then I think they had a bit of the same with their headquarters, whatever they were called over time, right, it was us and them. And now we are the former Dancall, and we, and in NorCOM we thought about the other companies, those that did not have anything to do with this industry, they should be kept out, we are these ones. And then you actually drove, drove into death, because NorCOM seized to exist, and had to join a new and bigger world as ICT NorCOM is today, right. So it is kind of the same story, all around, right, and in that way I think the parallels are there. "

"Buus: ... Der var, jeg tror der var en stor fælles kultur, iblandt alle virksomhederne på det punkt der.

Reinau: Ok kan du uddybe det, hvordan,

Buus: Jamen netop som det du siger, og jeg tror at du, hvis du gik over til Motorola, så tror jeg de har haft lidt af det samme med headquarter, hvad nu de så hed igennem tiderne, ikke, hvor det var vi og de. Og nu er vi det gamle Dancall, og vi, og i NorCOM tænker vi også at de andre virksomheder, dem der ikke har noget at gøre med den branche her, de måtte holde sig udenfor, vi er dem her. Og så kørte man faktisk, kørte faktisk i døden, fordi NorCOM holdte op med at eksistere og skulle tilslutte sig en ny og større verden som ICT NorCOM er i dag ikke. Så det er egentlig lidt det samme forløb hele vejen igennem ikke. Og det, så på den måde synes jeg at parallelerne er der." (Buus 2010)

The focus on competences along with the unity, i.e. us against them outside, also meant that people intentionally, or unintentionally, maybe gave themselves a role in the so-called success which was too large. Niels Buus made this point, and the argument was that throughout the history of the NorCOM cluster the discussion was on how good people in the cluster were technologically and how many work places these technologies created. Niels Buus's point was that the majority of these workplaces were not created due to the technological competences within the region, but in the headquarters around the work where the business of selling these competences and making money of them were conducted:

"... It was just the competencies. That was how good we were, how many jobs it was, it might be that we have seen wrong in how many were created in Northern Jutland. Bent, he talked a, and this is not a criticism of Bent, in that way, he talked about this one about how many jobs were created in Northern Jutland, etc. The truth was that it was not [the people in] Northern Jutland who created the jobs. It was in Munich, it was in Austin Texas, it was in Seoul, and it was in, what it is called, Taiwan and those around who created the jobs. Because they were the ones who sold the phones, it was they who created the business...

... So it was not us who created the jobs, they were given to us because at the time we were very good and there was a huge need for those products at the time. It is really, what, things can be articulated in many ways, and we can attack it from many different angles, but this is inside the core of some of it. And so we believe that we create jobs. Some place, we believe that we create jobs, but we do not. We are good at making these things, but we have never placed ourselves to be the ones who have the command to create the jobs

"... det var jo netop kun det kompetencemæssige. Det var jo hvor dygtige var vi, hvor mange arbejdspladser var det, det kunne godt være vi har set fejl hvor mange arbejdspladser er der skabt i Nordjylland. Bent han kørte jo sådan en, det er jo ikke en kritik af Bent det her, på den måde, han kørte sådan en med hvor mange arbejdspladser er der skabt i Nordjylland osv. Sandheden var jo at det var ikke nordjyder der skabte de arbejdspladser. Det var i München, det var i Austin Texas, det var i Seoul, og det var i hvad nu det hedder på Taiwan og de der rundt omkring, der skabte de arbejdspladser. Fordi det var dem der solgte mobiltelefonerne, det var dem der skabte forretningen...

... så det var ikke os der skabte de arbejdspladser, vi fik dem foræret fordi at vi på det tidspunkt var dygtige og der var et kæmpe behov for de produkter på det tidspunkt. Det er egentlig, det, tingene kan formuleres på mange måder, og vi kan angribe det fra mange forskellige vinkler, men det er inde ved kernen af noget af det. Og så tror vi på at vi skaber arbejdspladserne. Et eller andet sted tror vi på at vi skaber arbejdspladserne, men det gør vi ikke. Vi er gode til at lave de her ting, men vi har aldrig nogensinde sat os ind for at være dem der har kommando over at skabe arbejdspladserne" (Buus 2010)

Another important thing to notice in relation to this is that the managers in the NorCOM association saw the companies in NorCOM as "companies", although most of them were R&D departments owned and run by MNCs located outside the cluster. As an example we can take the interview with Niels Christian Gjerrild. In this he argued in relation to his experiences as manager in Ericsson, at the time when Ericsson shut down some activities in Aalborg:

"Of course, there is a certain warning in that and there, but in principle *half of my business disappears* because in the product, in the product development group, they find out that, no, that is not the direction we should be going in, we should be going in another." (Gjerrild 2010, italics added)

"Selvfølgelig er der et vist varsel i det og det der, men i princippet falder *halvdelen af min forretning* væk sådan fordi man i produkt, i produktovervejesgruppen finder ud af, nej, det er nok ikke den vej vi skal gå, vi skal gå en anden" (Gjerrild 2010 Italics Added).

It was not half of his development department which was lost, but half of his business. In an newspaper article in Jyllands-Posten from the 15 of November 2000 Niels Christian Gjerrild is quoted boosting at the fact that himself and his secretary are the only two persons at Eriksson's subsidiary in the NorCOM cluster who do not do R&D work (Bastholm 2000). Eriksson's site in the NorCOM cluster was thus not a business in the traditional understanding, as an organization making a profit. It was a development department headed by a manager in the form of Niels Christian Gjerrild.

And this way of seeing such R&D subsidiaries, or as we may call them, externally owned R&D departments, was apparently widespread among managers. This shows both in the articles in the media dealing with these companies where they are presented as companies, as well in the minutes from the NorCOM meetings where it is discussed what companies that should be allowed to join the organization. Niels Buus noticed this way of articulating the companies in the cluster, as he explained in an interview, when we discussed the point made by Niels Christian Gjerrild, that only two persons in his firm did not do R&D work:

"Well, what it was, it was that maybe we also talked too much about these, we thought of them as whole companies. And that is underlined by Niels Christian when he says, well, it was not a whole company. It was a development department with a CEO. But that does not create a whole company. They did not have sales, they do not have, they had, there were internal deliveries to other places, to other parts of a company which could have development departments in lots of other places too. And that, you could turn it upside down and say, if there had been a time where somebody, and we should not be throwing away what we were handed, that is not it, but if somebody had sat down and used the competencies to create more business, to come up with solutions, to try to create solutions, then today we would have had people who had used those competencies to do lots of other things. Things that are now spreading to other places, that we did not get in on because we were focused on creating telephones for Siemens in Munich and for Motorola somewhere else and Texas in yet another place. So our best minds were used to look at things they thought up elsewhere or for needs created elsewhere. We did not use them to start taking the next steps." (Buus 2010)

"Jamen det der var, det var at vi måske også snakkede meget om at de der, vi betragtede dem som hele virksomheder. Og det understreger egentlig det Niels Christian siger, jamen det var ikke en hel virksomhed. Det var udviklingsafdelinger med en administrerende direktør. Men det bliver det ikke til en hel virksomhed af. De har jo ikke afsætning, de har ikke, de skulle, det var interne leverancer til andre steder, til andre dele, af en virksomhed som kunne have udviklingsafdelinger alle mulige andre steder også. Og, det, man kan også vende det om og sige, hvis nu det havde været på et tidspunkt hvor der også, vi skal jo ikke smide det her væk vi fik, det er jo ikke det der er, men hvis der var nogen der havde sat sig ned og brugt de kompetencer til at lave mere forretning, til at udtænke løsninger, til at prøve at sætte løsninger i verden, så havde vi i dag siddet med nogle som havde brugt de der kompetencer til at lave alle mulige andre ting. Ting som nu er ved at sprede sig til andre steder, som vi ikke var kommet med på fordi vi fokuserede på at udvikle telefoner til Siemens, til München og til Motorola i det ene sted og Texas det andet sted. Så vores bedste hjerner blev brugt til at kikke på det de udtænkte andre steder, eller de behov de udtænkte andre steder. Vi brugte dem ikke til at begynde at tage de næste skridt." (Buus 2010)

So the MNC subsidiaries were articulated as companies, not as R&D departments own by MNCs, but as Niels Buus argues they could also be understood as R&D departments living of technology. And this is the key to understand why the understanding of business competences among the managers in the cluster was rather narrow. Or in other words, why it was different from the understanding of business, which people with a business background such as Niels Buus. For Niels Buus the objective of business was to make money and a profit. However, for most of the

other managers, business was, as he also argues, to supply technology to MNCs and thereby keep their R&D departments afloat.

This helps us to understand the creation of boundaries between NorCOM companies and companies from other fields, such as the IT field, during the 2000s. Because the rational from a business point of view of opening up, as Niels Buus argued for, would have been that by fusing the wireless technology with say IT or satellite communication, new product could have been made, new markets pursued, and profits and whole companies could have been made, as he argues. But this was not the understanding of business which was widespread among most of the managers in the NorCOM cluster.

In their view business meant guessing what application would be the next killer application within mobile communication, and then try to obtain work on that in their R&D departments, or as they said, R&D companies. We saw in the TIDK case, that the top manager who came from the outside in the last years of TIDK lifespan argued that the local managers had thought about all kinds of different technologies and their potential, but never done anything about it. Similarly, Sven Vestergaard, who became the last chairman of the NorCOM association, explained in an interview that over time there had been never-ending discussions in the NorCOM association about what the next killer application in the mobile phone world would be:

“And what we discussed all the time up here, what we said was, that we needed to wear the commercial glasses, i.e. it was, what is the killer application of the future. That is a concept that has been asked so many times in Northern Jutland. But nobody can point it out. Well, that is again the story about why SMS became so popular, if we had known in advance that would have been great, or if you knew what the next big thing was. On the contrary, you could say that lots of things have been put into phones that we thought were good things, but that have never been used. And that is, you could say, all those things that you have press three times to get to, those are not successful

“Og det vi hele tiden drøftede heroppe, det var at vi sagde, at vi skulle have de kommercielle briller på, dvs. der var, hvad er fremtidens killer application. Det er et begreb, det har været stillet så mange gange i Nordjylland. Men der er jo ingen der kan pege på det. Altså det der igen med hvorfor blev sms populær, hvis man havde vidst det på forhånd, så havde det været godt, eller hvad man vidste hvad det næste det var. Til gengæld kan man sige der er jo masser af ting der er kommet ind i telefonerne som vi troede var gode ting, men som jo aldrig rigtigt kom i anvendelse. Og det, man kan sige, alt det du skal trykke 3 gange for at komme frem til, det er ikke blevet til en succes.” (Vestergaard 2010)

So to try to define what the understanding of business among the managers in the NorCOM companies was, in the late 1990s and in the 2000s, we can say that a focus on business as making products, exploiting markets and making a profit was not the case. What was understood as business was being able to see what new technologies and application that would go into mobile phones, and build competences within these technology fields and applications.

And this leads back to the writings on technology by Bent Dalum. One can say that whereas (Gelsing & Brændegaard 1990) promoted the classical understanding of business, which was that both technology and business talent as well as financial capabilities had to be present so that a profit could be made, (Dalum 1993) and (Dalum 1995) promotes a understanding of business as being tied more to technology. Technology thus becomes the core, and the challenge facing managers becomes to keep up with the technological development, it becomes, in other word, to stay in front of the technology race and be among the best worldwide.

This technology-focused understanding of business among managers in the NorCOM cluster, as well as Bent Dalum from the business department at AAU, or a technology focused discourse

around business as we can also call it, is the key to understanding the events occurring around the bubble in 2000, and the following years.

The focus on technology in relation to business, i.e. the question: what is going to be the next killer application, and how can we position ourselves in NorCOM to build the technology competences needed for this application, was gaining momentum in the discourse in the NorCOM cluster in the late 1990s and what put this question at the centre of the stage was the IT bubble in late 2000.

With the bubble this discourse, which I will call the “technology focused business discourse” came together with the “success discourse” which had gained momentum in the media in the late 1990s as discussed earlier, and a third discourse also came into the play, and this can be called “the discourse about the legacy of DC Development”. DC Development was, as discussed earlier the joint venture between Dancall and Cetelco, which lifted the companies into the GSM technology. In writings about DC Development, the discourse around the venture changed during the 1990s. In the early 1990s, the academic writings explained it as a venture which gave the companies the GSM competences, but which also drained the mother companies financially to an extent from which they were never able to recover from. The discourse around DC Development changed, however, during the 1990s in both academic writings emerging at the business department at AAU, as well as in the new media. By the late 1990s and the early 2000s, the story had become, that DC Development was a world class technological success, and that it formed the basis for the development of the cluster, since the engineers working at DC Development, learning the GSM technology, later spread into other companies in the cluster or started their own. Thereby DC Development and the leap it caused into the GSM era becomes the key to the success of the cluster according to the discourse.

After the burst of the bubble, this discourse around DC Development enters into a functional relationship with the discourses emerging in the late 1990s, and therefore the outcome of the bubble is not that companies look at new business areas, understood as new markets for wireless technology or new niches. Instead they turn to their history, as it has been constructed at the business department, in media and in the companies in stories about DC Development and Dancall. And the objective therefore becomes to make the next jump technological, from GSM to UMTS. This jump becomes the Holy Grail in the cluster, this jump that can save the day, and create a new generation of success to the companies in the cluster.

This leads, as we shall see first to an effort to create a new joint venture, and thereby copy the DC Development story. This however fails, because it is not possible to create a venture, which the companies in the cluster, now mainly MNC affiliates, can agree upon. When this fails, the outcome is that the companies, now mainly MNC affiliates continue each in their own direction, utilizing predominately the GSM competences in the cluster. Endless discussions emerge in academic writings and in newspaper articles, and in the NorCOM association, on how to make the jump from 2G to 3G. A jump, which was never made. The focus on this jump, given the success of the jump from 1G to 2G coupled with the firm belief that technology is the key to the success of the cluster, not business, means that new business areas are not investigated, and no opening toward for example the IT environment in North Jutland, or the Space technology field, which was also open at the time, is made. The quest simply becomes the jump to 3G and the new killer applications in the mobile phone field.

8.6.2 The struggle for a new technology jump

To describe how the struggle for a new technology jump resulted in a struggle against other institutions in the region and how this shaped the NorCOM cluster, I will start by presenting a

number of different discourses which came together throughout the 2000s. When I have presented each of them, I will discuss the relationship between them, and thereby hopefully pull the pieces together in a picture, which shows how the NorCOM association became what it was during the 2000s.

The first is the discourse around DC Development. I have earlier described that DC Development became what united the wireless environment in Northern Jutland in the early 1990s. In the early 2000s, the outcome of DC Development, i.e. the technology jump from 1G to 2G became something which people wanted to do again, but this time from 2G to 3G. This technology jump, from 2G to 3G became the Holy Grail, which could have revitalized the cluster and given a new generation of success stories, according to the discussions in the NorCOM association.

The second discourse which we need to understand is the one surrounding Dancall. After the financial problems which emerged around DC Development, Dancall lost its independence and was acquired by an MNC. After having been sold to new MNCs a number of times the company was split up and the production facilities in Pandrup was taken over by Flextronics, while Siemens acquired the R&D activities and moved these to Aalborg. Flextronics were to keep producing mobile phones in Pandrup, but due to cost consideration the factory was eventually closed, leading to the layoffs of more than 1700 people in Pandrup, which was a catastrophe for the municipality. In the Dancall section below, I will present an analysis building on more than 2000 newspaper articles about Dancall, Amstrad, Bosch Telecom and Flextronics from the time of DC Development to the closure of Flextronics. The rationality is that this analysis shows three important issues. Firstly it shows that business and marketing capabilities were also lacking in Dancall. We shall see how the company missed the needs of the market time and time again, and how new owners with business capabilities were capable of making money from the company, something which the Danish owners had not been able to do. This thus adds to the point made by (Gelsing & Brændegaard 1990), and discussed in the previous chapters, that business and marketing knowledge, and as the discussions around Dancall will show also organization capabilities were lacking in the region. Secondly, the analysis will show how a gap between the relatively small R&D companies in the NorCOM association and the relatively big Dancall which was a whole company was constructed, which in turn made it easier to discuss business in the way I presented above, i.e. not as a matter of selling and making a profit, but as finding the technologies of tomorrow. Thirdly and finally, it will show how the survival of Dancall was constructed into an issue of low skilled production jobs in peripheral areas of Denmark. This discussion is important to understand if one is to understand the relationship between the NorCOM association and the county and Aalborg municipality, which I shall come to later. Because, after the closure of Dancall, the wireless industry was dead in the eyes of the politicians, and therefore did not deserve funding from public business development projects, as one interview respondent put it.

When I have presented the discourses around DC Development and Dancall, I will turn to what happened in the NorCOM association through the 2000s. And in this analysis I will go through the situation around the time of the bubble, and how the relation to other institutions and organizations developed. And with the understanding from the previous discussion about business competences in NorCOM, and the two analyses of DC Development and Dancall, in mind, it will be possible to understand why the NorCOM association developed as it did in these years. In other words, how the association became locked in a force relationship with other organizations, which limited the possibilities of action for its members, and how this influenced the self-understanding in the cluster.

8.6.3 The legacy of DC Development

To uncover the written history of DC Development I have used the Informedia database. DC Development is mentioned in only 16 articles in this database (all articles before 7/9-2010). This is a relatively small number of articles, compared to the fact that I have identified for example 845 articles in the database mentioning Dancall. Further, a number of scientific papers articulate the story of DC Development, and in the following I will analyse what these newspaper and scientific articles say about DC Development.

We have seen how DC Development was discussed by (Gelsing & Brændegaard 1990) and (Dalum 1993) so I will not dwell further on these texts. Instead I will turn the focus to how it was interpreted in papers and articles later, and how this interpretation changed over time. In (Dalum 1995) it is written:

“Since 1992 major changes have occurred for the biggest radiocommunications firms in the system. In *mobile communications* the joint-venture DC Development was closed although it succeeded in developing basic technology for a 1. generation hand portable GSM terminal in 1992. Dancall and Cetelco became members of a small and exclusive club of firms, of which Motorola, Ericsson and Nokia were the most prominent. Available evidence points at the DC Development technology as belonging to the world frontier. A knowledge asset, 30 young electronic engineers who had succeeded in launching a major technological innovation as a team, had emerged. However, the creation of this highly critical asset for the mobile communications industry in the region had strained the financial situation of the two mothers firms to such an extent, that they lost their independence.” (Dalum 1995, p.15)

What we see in this is an argument about technology; the technology which DC Development created belonged to the world frontier, the engineers in DC Development was member of a small club of companies such as Motorola, Ericsson and Nokia. This wording is interesting; they are in the “same club”, which projects an image of equality. They made a “major technological innovation as a team”. What is described in less picturesque words is the financial side of the issue; it is just described that the development strained the mother companies financially, and the companies lost their independence.

In a publication four years later (Dalum, Holmén, Jacobsson, Praest, Rickne, & Villumsen 1999) the story about the technological side of DC Development is explicitly framed as highly successful:

“In *mobile communications*, the DC Development joint-venture had to be closed in 1992. The two mother companies, Dancall and Cetelco, could not manage financially with this project, which - from a technological point of view - was highly successful. A knowledge asset of 30 young electronic engineers, who succeeded in launching a major technological innovation as a team, had to be split. The creation of this critical asset for the mobile communications industry in the region had strained the financial situation of the two mother firms to such an extent that they lost their independence. Although the team of engineers was split, it managed, however, rather quickly to ‘clone itself’ in that of several firms in the region were able to develop GSM terminals shortly after DC Development was closed.” (Dalum, Holmén, Jacobsson, Praest, Rickne, & Villumsen 1999, p.13)

Although it is maintained that financial troubles caused the closure of the two parent companies, it is stated, that the engineers with their knowledge had already created new companies, which balances the negative message that Dancall and Cetelco could not handle the project financially. In other words, technologically DC Development was a success, and although Dancall and Cetelco could not handle the project financially, the technological success lived on in new companies started by engineers from DC Development. What we see emerging here, is thereby a distinction

between technology on the one hand, and business on the other. And technology is starting to be put at the center of the cluster.

Whereas the technological side of DC Development, and as such Dancall and Cetelco, had been a success, the business side had not. And this was elaborated further in the media around 2000. In a news article in Erhvervsbladet the 28th of February 2000, (Carstensen 2000a), the following is said about DC Development:

"The company was a mutual development company for the two Danish owned mobile phone producers in Northern Jutland, Cetelco and Dancall. Both of them were too small to develop GSM-technology on their own, but together they had the resources. The resources did not, however, stretch to international competition. Unlike Finnish Nokia and Swedish Ericsson Denmark was never able to reap a major Danish-owned mobile producer."

"Selskabet var et fælles udviklingsselskab for de to nordjyske, og danskejede, mobiltelefon-fabrikker Cetelco og Dancall. De var hver især for små til selv at udvikle GSM-teknologien, men sammen havde de kræfterne. Kræfterne holdt til gengæld ikke til den internationale konkurrence. I modsætning til finske Nokia og svenske Ericsson har Danmark aldrig kunnet høste en stor danskejet mobiltelefonfabrik" (Carstensen 2000a, page unknown)

Again we see the distinction between technology and business: Dancall and Cetelco possessed the ability to jointly develop the GSM technology, but not the ability to compete with the giants in the industry. One conclusion, which was drawn in the cluster from this, was that had it not been for lacking ability to compete, then Dancall or Cetelco could have become the next Nokia, because the engineers could develop the needed technology, which was world class as we saw in earlier articles.

An article the 15th of November 2000 with the heading "IT in Northern Jutland: Background: Growth from a trailer" (IT i Nordjylland: Baggrund: Vækst fra en skurvogn) which uses CEO of NOVI Sven Valentin as a source, (Bastholm 2001b), adds arguments to why the business side was a failure:

"The Research Park Novi has among other things housed the company DC Development, that was a joint venture between Danish Dancall and Cetelco. Together they developed one of the world's first GSM-phone and according to Svend Valentin there were no immediate barriers to prevent Dancall from becoming what Nokia is today. "But unlike Nokia we do not have a tradition for a global distribution network. Traditionally, we are a nation of farmers and fishermen. We were never an industrial society. And that is why Dancall never became big," says Svend Valentin. Svend Valentin enjoys seeing the world's leading telecom companies pour into Northern Jutland, and he is convinced that it is because of the high number of well-educated engineers' competencies. "There is clearly competition. It is something else than being stuck on a plain without a rider in sight," says Svend Valentin, who joined Novi in 1993"

"Forskerparken NOVI har blandt andet huset selskabet DC Development, der var et samarbejde mellem danske Dancall og Cetelco. De udviklede i fællesskab en af verdens første GSM-telefoner, og ifølge Svend Valentin var der umiddelbart intet til hinder for, at Dancall ikke kunne være blevet det, som Nokia er i dag. "Men vi har ikke som Nokia nogen tradition for et globalt distributionsnet. Vi er traditionelt en nation af bønder og fiskere. Vi har aldrig været et industrisamfund. Og derfor blev Dancall aldrig store," siger Svend Valentin. Svend Valentin nyder at se verdens førende televirksomheder strømme til Nordjylland, og han er overbevist om, at det skyldes de mange veluddannede ingeniørers kompetencer. "Her er en åbenbar konkurrencesituation. Det er noget andet, end hvis du sidder ude på sletten og der aldrig kommer en rytter forbi," siger Svend Valentin, der kom til NOVI i 1993." (Bastholm 2001b, p.5)

Here we see that the reason for the failure according to Sven Valentin was that Dancall lacked the tradition for a global distribution network. What we see there is an elaboration on the distinction between technology and business. We have the “well-educated” engineers on one hand, and their competences, which were attracting some of the world leading companies to the region. And then on the other hand we have a lack of tradition for global distribution networks, being a nation of “farmers and fishermen”.

We see here also that the success aspect of the story is ascribed directly to the engineers, while the failure aspect is ascribed explicitly to the region and its history. The analysis of the discourses surrounding Dancall and Flextronics, which I will come to in the next section, will illuminate what one may call the “business failures” of Dancall. The company was far too small to compete according to several articles, both on its own and as part of Amstrad and Bosch, the products developed were too heavy and too expensive and hit the market with wrong timing. The analysis will also show how this issue, of what I may call a lack of business competences, was transformed into a regional development discourse dealing with jobs and unskilled workers.

In another article on the 15th of November 2000 in Jyllands-Posten, with the heading “IT in Northern Jutland: Background: The IT-Miracle in the Jutland soil” (IT I Nordjylland: Baggrund: IT-miraklet i den jyske muld), (Bastholm 2001a), Bent Dalum from AAU explains that DC Development has had a significant role in the success of the region.

“Scandinavia was ahead with NMT. Nowhere else in the world were you able to call between countries,” says Bent Dalum. When the thought of creating a common European telephone network, GSM, emerged the two competitors Dancall and Cetelco made an agreement to found the company DC development to develop a GSM phone together. The bet was an extremely costly affair and one of the consequences was that Cetelco was bought by the German company Hagenuk. Later on Dancall also ran into financial trouble and was sold for a song to the English Armstrad.

GSM Succes

However, Bent Dalum is not in doubt that DC development’s development of the GSM-telephone plays a major role in the region’s current success. “The whole world sees that a GSM-telephone is developed in Denmark. And if you are studying at the University of Aalborg, there is a reason to stay and become a part of the development. And the gang from DC Development they cloned themselves. Now there are three or four gangs developing GSM and UMTS in other companies,” the 52 year old associated professor adds.”

“Norden var forud med NMT. Ingen andre steder i verden kunne man ringe imellem lande,” siger Bent Dalum. Da tanken om at udvikle det fælles europæiske telefonnet GSM begyndte at komme i stand, indgik konkurrenterne Dancall og Cetelco en aftale om at stifte selskabet DC Development for i fællesskab at udvikle en GSM-telefon. Satsningen var en særdeles bekostelig affære og en af følgerne blev, at Cetelco blev opkøbt af det tyske firma Hagenuk. Senere løb også Dancall ind i økonomiske vanskeligheder og blev solgt for en slik til engelske Armstrad.

GSM-succes

Bent Dalum er dog ikke i tvivl om, at DC Developments udvikling af GSM-telefonen har været af stor betydning for regionens nuværende succes. “Alle i verden ser, at der bliver udviklet en GSM-telefon i Danmark. Og hvis du går på universitetet i Aalborg, er der en grund til at blive og være med i udviklingen. Og sjakket fra DC Development klonede sig selv. Nu er der tre-fire sjak, der udvikler GSM og UMTS i andre virksomheder,” supplerer den 52-årige lektor.” (Bastholm 2001a, p.6)

As can be seen the financial troubles is mentioned here, but DC Development is also said to have played a significant role in the success of the region because of the visibility the development work gave worldwide. In 2001 DC Development was described as a “technological success” again in a scientific paper, where (Dahl & Pedersen 2001) writes:

“The development of GSM as the second generation mobile phone caused significant changes in the communication industry in North Jutland. DC Development was a technological success. Dancall and Cetelco were in 1992 among the first handful of firms in the world to introduce a GSM mobile phone, but later they experienced financial problems and were acquired by foreign companies, and DC Development was closed down.” (Dahl & Pedersen 2001, p.10)

The same year DC Development hits the media again, now on the front page of *Ingeniøren*, and the theme of the article is whether the cluster is capable of making the jump from the second generation of phones, the GSM phones, to the third generation, the UMTS phones. And in regard to this, DC Development serves as a role model, in an article with the heading UMTS dropped on the floor” (UMTS tabt på gulvet) in *Ingeniøren* the 23rd of Marts 2001 (Mathiessen 2001b). The point made in this article is that DC Development created an enormous spin-off activity, and a similar project is needed to give the cluster a technological lift and a future, according to the CEO of Maxon Telecom Claus Melgaard and Torben Amtoft, former CEO of Telital R&D:

“Both Torben Amtoft and Claus Melgaard recommended a joint venture, like when Dancall and Cetelco created DC Development. Here the GSM-technology was developed, and that created an enormous spin-off effect. But it is difficult today where most of the companies have foreign owners. - The local managers have to bang the table towards the parent companies. That we think globally, should not keeps us from cooperating locally, otherwise we end up without any competencies, says Torben Amtoft from the Italian-owned Telital R&D. Claus Melgaard in Maxon has to convince his Korean bosses about the benefits of a development cooperation in Northern Jutland: - That would demand a lot of leg work. They would probably feel like Maxon were giving away knowledge for free instead of vice versa. But for UMTS that race is run. We are facing a product launch in a few years, maybe even a few months”

“Både Torben Amtoft og Claus Melgaard anbefaler et joint venture, som da Dancall og Cetelco oprettede DC Development. Her blev GSM-teknologien udviklet, og det skabte en enorm spin-off effekt. Men det er svært i dag, hvor de fleste selskaber har udenlandske ejere. - De lokale ledere må slå i bordet over for moderselskaberne. At vi tænker globalt, må ikke afholde os fra at samarbejde lokalt, ellers ender det med, at vi ingen kompetencer har, siger Torben Amtoft i det italiensk ejede Telital R&D. Claus Melgaard i Maxon skal overbevise sine koreanske chefer om fortræffelighederne ved et nordjysk udviklingssamarbejde: - Det ville kræve meget benarbejde. De ville nok føle, at Maxon for ærede viden væk gratis i stedet for omvendt. Men for UMTS er det løb nok kørt. Vi står over for en produktlancering om få år - måske allerede om få måneder.” (Mathiessen 2001b, p.1)

So these two managers put forward DC Development, which was a failure financially, as a role model because it raised the technological competences and created spin-off within the region, but nothing is said about the business side of the venture. In the bigger article in the same newspaper the same day, the point is elaborated:

“It could take place under the auspice of Novi or in the community like DC Development, he says. Maxon is one of the companies that now produce parts of the UMTS-technology. 10 years ago DC Development was the company that developed the GSM-phone in Denmark – a joint venture between two competitors, Dancall and Cetelco. DC Development was a partnership with a shared cultural background. It would have been much harder to do today, where none of the UMTS Companies in Denmark are Danish [owned]. But that is how we should have done it – developed the fundamental technology together and then competed on the applications. Claus Meldgaard believes it is too late now. It would take 50-100 people in 2-3

years, equivalent to 2-300 million DKK. But in 2-3 years the technology will already be there.”

“Det kunne foregå i Novi-regi eller i et fællesskab som DC Development, siger han. Maxon er et af de firmaer, der nu laver dele af UMTS-teknologien. DC Development var for ti år siden det firma, der udviklede GSM-telefonen i Danmark - et joint venture mellem de to konkurrenter, Dancall og Cetelco. - DC Development var et samarbejde med fælles kulturbaggrund. Det vil være langt sværere i dag, hvor ingen af UMTS-firmaerne i Danmark er danske. Men sådan skulle vi have gjort - udviklet den grundlæggende teknologi i fællesskab, og bagefter konkurreret på applikationerne. Claus Meldgaard mener, det er for sent nu. Det ville kræve 50-100 mand i 2-3 år, svarende til 2-300 millioner kroner. Men om 2-3 år er teknologien allerede på banen.” (Krøyer 2001a, p.2)

This adds an important aspect to the discourse, which is that the venture succeeded because of the shared local culture in Dancall and Cetelco. The idea of creating a joint venture in the UMTS field among RTX Telecom, Shima Communication, Maxon Telecom and Telital R&D Denmark (the then former Cetelco), was abolished in late 2001 as described by Erhvervsbladet.dk the 22nd of October (Erhvervsbladet.dk 2001). This is important because it shows that it was not possible to find a common ground between the companies, some of which were foreign owned.

Another article in Ingeniøren the 14th of June 2002 indicates, that some of the issues which the analysis of Dancall will show haunted this company, for example a lack of organizational capabilities, also haunted DC Development:

“The transition to the digital technology GSM, 2G, at the end of the 1980s was a big leap, and Dancall and Cetelco entered into a cooperation to develop the fundamental technology in the joint venture DC Development. GSM could have become the start of prosperous period for the two companies, but instead it became the end of the two independent companies. Among other things because the GSM competition was significantly harder than previously experienced with NMT. At the same time the form of the cooperation made it harder to optimize the complete design, and that contributed a lot to the products quite quickly becoming too expensive, too big and too heavy compared to the competitors”

“Overgangen til den digitale teknologi GSM, 2G, i slutningen af 1980'erne var et stort spring, og Dancall og Cetelco indgik et samarbejde om udvikling af grundteknologien i det fælles selskab DC -Development. GSM kunne være blevet starten på en fremgangsrig periode for de to firmaer, men i stedet blev det til de to selvstændige virksomheders endeligt. Blandt andet fordi konkurrencen på GSM var væsentligt hårdere end det, man havde set på NMT. Samtidig gjorde samarbejdsformen det sværere at optimere det totale design, og det var stærkt medvirkende til, at produkterne ret hurtigt blev for dyre, for store og for tunge i forhold til konkurrenternes” (Hansen 2002, p.14)

In this we see that the failure of DC Development is explained by fierce competition and the way in which the venture was organized, leading to products, which were too large, too heavy and too expensive, products which were not aimed at the market correctly. Products which may have been leading technologically but were not what the market demanded. This indicates, that DC Development possessed the same capability shortcomings as the analysis of Dancall revealed. However, this articulation of the business failures of the DC Development joint venture does not get a foothold in the discourse around DC Development, because, as I have argued earlier, this discourse is characterised by a focus upon technology.

Why is this the case, we should ask, how did this focus emerge? The data show that this must be due to the rationalities of the actors and institutions forming the discourses. As Foucault argued, no single individual can be ascribed the emergence of a discourse, because it always emerges in the interstice. But when we look at the discourse around DC Development we see that some of

the institutions in which it emerges and some of the persons who articulated it have clear motives for putting technology in the centre.

This discourse from NOVI above, that Dancall had what it takes technologically to compete with Nokia etc. fits well with the fact that it is beneficial for NOVI to emphasize the “technological success” discourse, because NOVI, as the science park, which housed DC Development, and which currently house several small high-tech companies, will benefit from articulating the cluster as a cluster which can create technology that can compete with the large players in the industry. Such a discourse will be beneficial for NOVI.

Looking at the rationales for promoting the “technology as the core” in scientific papers, we must understand that most of what has been written about the cluster emerges at Aalborg University, in the Business department, and more specifically in the “Innovation, Knowledge and Economic dynamics” (IKE) research group. This research group has originally had a focus upon innovation, National Innovation Systems and Innovation processes in firms, as well as in clusters. As of 2010, the group’s own description of its focus was:

“The IKE Group does research on economic, technical and institutional change. The main research themes include economic evolutionary modelling, theory of the firm, national systems of innovation, international trade and competitiveness and the interplay between economic and ecological issues.” (www.business.aau.dk 2010)

Therefore it was logical for the researcher in that group to focus on the innovation aspect of the cluster, and in the IKE environment innovation was conceptualized as a process, which incorporates business issues as well as technological issues. It seems however, that when the discussion was moved from the IKE environment with researchers knowing this, into a cluster environment populated with engineers, innovation became equated with technological invention, and thus technology. When researcher argued that innovation was necessary, engineers apparently understood it as technological development being necessary, and the business side was consequently overlooked.

Interpreted in this way, the Business Department at AAU articulates the technological success, and so does NOVI. Another key player in the discourses, not so much surrounding DC Development but more the NorCOM cluster in general, is the Electronic Systems department. This department had a clear rationale, as I will return to, in articulating technology as the core of the cluster, and articulating the high level of this technology, because a discourse articulating the technology in the cluster as world class will support the opportunities for this department in attracting students, researchers and funding.

The NorCOM firms also had a rational to promote the technological capabilities, primarily in relation to marketing, because the promotion enhancing their own value, and ability to attract and maintain MNCs. A secondary rational for the NorCOM companies were to distance themselves from the discourse dealing with Dancall, which I will return to later. Dancall was articulated not as an issue of a mobile phone company which misinterpreted the markets etc., but as a case of a production company which fared badly in a high-wage area, and thus as being different from the R&D companies in the NorCOM association.

The two discourses, the discourse about the successful technological side of the DC Development story, and the business discourse about the following acquisitions by MNCs are repeated in the scientific paper (Dalum, Pedersen, & Villumsen 2002):

"The two local producers and competitors, Dancall and Cetelco, announced in 1988 a pre-competitive joint venture, DC Development, to develop the basic technology for GSM terminals - located on neutral ground at the newly founded Aalborg University science park, NOVI. The two firms explicitly planned to close the joint venture when the mission was accomplished and compete based on different features of the terminals, such as design.

The DC Development team peaked at approximately 30 persons in 1992 and managed to develop a GSM terminal presented at the annual CEBIT fair in Hannover, Germany in 1992. At the time terminals were presented by only a handful of companies, including Ericsson, Motorola, Nokia and Dancall-Cetelco (in various disguises such as Philips, Hagenuk and Dancall). This innovative effort by the small North Jutland firms basically drained them completely financially. Both were taken over by foreign companies. Dancall was acquired by UK Amstrad, then by Bosch and later again by Flextronics and Siemens. Cetelco was taken over by German Hagenuk, to be sold later to Italian Telital." (Dalum, Pedersen, & Villumsen 2002, p.15)

The authors explain further in the paper, that DC Development thereby became a central event in the development of the cluster since it is due to spin-off activity following DC Development's closure that the cluster became an international hub in GSM development:

"But there was a widespread fear at the time, that the (planned) closing down of DC Development would be the end for the region in GSM. However, instead of dying this group of industrial development engineers managed to start a cloning process - through existing firms or via spin off's - which resulted in the region becoming a development hub for GSM terminal development with six-seven firms developing GSM equipment (2G and 2G+), basically for foreign companies." (Dalum, Pedersen, & Villumsen 2002, p.16)

In Jyllands-Posten the 26th of Juli, 2004, we find a description of DC Development in the article with the heading "IT: the mobile industry is sprouting again" (IT: Mobilindustrien spirer igen) (Stenvei 2004):

"GSM as a milestone. The milestone was the development of the world's first GSM-telephone in 1992. It was the development company DC Development that was behind the historical event. Behind DC Development stood two Danish mobile phone companies Dancall and Cetelco. The rest is, as you say, history. Over the years many of Dancall's employees moved on to other companies and they were thereby a significant reason behind why so many local companies were established, these [companies] have through the years managed to play a crucial role in the international mobile market..."

"GSM som milepæl. Milepælen var udviklingen af verdens første GSM-telefon i 1992. Det var udviklingsselskabet DC Development, der stod bag den historiske begivenhed. Bag DC Development stod de to danske mobilselskaber Dancall og Cetelco. Resten er, som man vil sige, historie. Gennem årene er mange af de ansatte i Dancall flyttet videre til andre virksomheder og dermed været en væsentlig årsag til etableringen af de mange lokale virksomheder, der gennem årene har formået at spille en afgørende rolle på det internationale mobilmarked...." (Stenvei 2004, p.6)

Now suddenly DC-Development has developed the first GSM phone, and "the rest is, as you say, history" is normally used when the rest is a positive history. The technological discourse is thus boosted, and nothing is mentioned about the financial troubles, only that the engineers involved has created a number of new companies in the cluster.

In a newer version of that article (Dalum, Pedersen, & Villumsen 2002), (Dalum, Pedersen, & Villumsen 2005), the argument from the first article is made more explicit. First the authors tell the same story as shown in the quotes above, with some more detail on the dynamics of the 1G market. But then towards the end of the article DC Development is mentioned again in a section

with the heading “Is UMTS (3G) a major threat?”, which discusses the change from GSM to UMTS technology in the cluster:

“The outcome for the cluster was that these large players did not go for local collaborative strategies, such as especially the joint GSM effort, DC Development, which became crucial for the vitality of the cluster during the 2G cycle. An initiative was, however, taken by the small players in the region – such as Maxon, Telital, Shima, and RTX – to discuss the establishment of precompetitive collaborative ventures in 3G technologies. The lesson from the initial stage of the 2G cycle concerning the potential benefits of collaboration was clearly understood within the cluster, but the companies could not agree on common goals and joint strategies.” (Dalum, Pedersen, & Villumsen 2005, p.238-239)

Here we see that it is stated that the “lesson” from DC Development has been learned in the cluster, the lesson was that such collaboration holds “potential benefits”. It is however interesting to note that the companies could not agree on common goals and strategies. In another paper from 2005, (Dahl, Pedersen, & Dalum 2005), a similar story is told:

“The challenge of building a GSM-standard mobile phone was seen to be a major economical and technical challenge for the mobile communication firms, since it was based on new digital technology. To cope with this, the two competitors Dancall and Cetelco formed a pre-competitive joint venture company, DC Development, with the purpose of building the basic modules of a mobile phone in close corporation with the Aalborg University. The companies should develop the rest of the phone (display, design etc.) themselves. T-Com/Maxon was also a part of the planning process, but decided not to join and continued to focus on the mobile phones for the old system.

DC Development was founded in 1988 and located at a new science park, NOVI, close to Aalborg University. They participated in the international GSM standardization and specification process, since the specifications were determined in parallel with the development of the terminals. DC Development succeeded in the development of basic modules, and the parent companies were among the first to produce a GSM mobile phone in 1992 in the world. In spite of the achievement and talks during this period of making DC Development a permanent establishment, the companies decided to end their cooperation. DC Development employed at the peak 30 engineers. The group was divided equally between the two firms after the closing.

The technological achievement of DC Development increased the international visibility of the cluster and strengthened the region’s reputation in wireless communication technologies. However, the new standard changed the market considerably as large multinationals continuously entered the promising GSM market. The consequence was increased competition, falling prices, rapid development and increased demand for volume production. The high development costs of GSM phones put Dancall and Cetelco into severe financial problems in the early 1990s, because they did not have enough financial backup to harvest their discoveries in this competitive market.” (Dahl, Pedersen, & Dalum 2005, p.7-8)

Here we see again the argument, that technologically DC Development increased the international visibility of the cluster, but because of the MNCs entering the field the competition increased, prices fell, development became faster and there was a demand for volume production, things that Dancall and DC Development could not handle due to limited financial resources.

The analysis in this section has now shown that DC Development caused the emergence of a discourse in which technology is articulated as being the core of the cluster consisting of R&D companies, and it is further articulated that the companies in the cluster produces world class technology. This section has also shown how a distinction between technological development and business success emerged. And we should keep in mind, that the so-called ‘business failure’

in relation to the financial issues faced by Dancall and Cetelco in these discussions around DC Development was another type of business, than what people in the NorCOM cluster understood as business. As argued earlier, business in their view was the process of identifying the next killer application and building the competences needed to produce this.

No discourse exists on its own, and no dominating discourse exists, instead a number of discourses exist at any time which influences each other, giving rise to new ones etc. Let me therefore turn to the discourses surrounding the Dancall story now. Whereas the discourses around DC Development placed the focus upon technology, and at the same time the argument that the key to the future was a similar technology jump from 2G to 3G, the discourses around Dancall put more and more distance between the R&D companies in NorCOM owned by MNCs and the “whole company” Dancall which were struggling with lacking business and marketing capabilities.

8.6.4 The legacy of Dancall

The discourses, which emerged around Dancall in the 1990's and 2000's, caused a separation of the discourses dealing with technological success and the discourses dealing with a lack of business capabilities. To understand this, let us start right after the closure of DC Development closure.

Because of the financial problems caused by the GSM development, Amstrad was capable of acquiring Dancall in 1993 for 65 million DKK. However, only 200 of the previous 600 workers at Dancall kept their job after the acquisition according to Berlingske Tidende 14th of September 1993 (Wormslev 1993a) and Telebørsen 13th of September 1993 (Telebørsen 1993). According to Amstrad, Dancall was a state-of-the-art R&D company in telecommunications, but lacked the ability to handle large scale production and the ability to buy components cheaply (Telebørsen 1993). Here we see the first statement in the discourse, coming from the British company, that organizational capabilities were lacking, i.e. the ability to handle a large production, and that business capabilities were lacking, i.e. the ability to get supplies at the right price. This fits with the statements from the founders of Cetelco, who argued when interviewed, that Dancall had the same weaknesses as Cetelco.

After the acquisition two discourses emerge in the newspapers, one discourse dealing with the R&D work, which has been acquired by Amstrad and the future of this, and another discourse dealing with the lay-offs in Pandrup, and their impact in the area.

The first discourse shows in an article called “Foreign Ownership is good for Danish High-Tech” (“Udenlandsk ejerskab godt for dansk high-tech”) in Berlingske Tidende the 15th of September 1993 (Schaumann 1993). In this article it is argued in the first line that the historical experiences with foreign acquisitions of companies of the same type as Dancall, are extremely good. Associate professor from Copenhagen Business School Finn Valentin is quoted saying:

“The old concern about how the most know-how intensive companies are bought, emptied of knowledge and then closed is unfounded. It is rather the opposite that is true. The companies are add-ed something. Usually, the Danish companies is included in an international corporation management, that is often far more professional, global and strategically minded than the former Danish management. Thus a range of managerial and strategic development opportunities are added to the company. And that means that the know-how resources in the company are given better possibilities of being tranformed to business areas and markets.”

“Den gamle bekymring om, at de mest know how intensive virksomheder købes, tømmes for viden og lukkes, er ubegrundet. Det er snarere det modsatte, der gør sig gældende. Virksomhederne tilføres noget. Som regel bliver den danske virksomhed skruet op i et internationalt

koncern-mannagement, der ofte er langt mere professionelt, globalt og strategisk tænkende, end det forhenværende danske mannagement. Dermed får virksomheden tilført en række ledelsesmæssige og strategiske udviklingsmuligheder. Og det gør, at de know how-ressourcer, der er i virksomheden, får bedre adgang til at blive omsat til forretningsområder og til markeder.” (Schaumann 1993, p.1)

He stresses however, that he is talking about tendencies in general, not Dancall specifically. The discourse on unemployment is voiced in B.T. the 21st of September 1993 (Bagger 1993) under the heading “The face of unemployment” (Arbejdsløshedens ansigt) where it is argued, quote:

”Northen Jutland has the highest unemployment rates in the country, and that is saying something. The other day, the English company Amstrad took over the mobile phone factory Dancall in Pandrup. But only 200 out of the current 600 employees are guaranteed continuous employment, so there is going to be another 400 unemployed. Women, of course, what else?”

”Nordjylland har landets højeste arbejdsløshedsprocent, og det vil ikke sige så lidt. Forleden overtog det engelske firma Amstrad mobiltelefonfabrikken Dancall i Pandrup. Men kun 200 af de hidtil 600 ansatte er sikret fortsat arbejde, så dér blev 400 nye arbejdsløse. Kvinder naturligvis, hvad ellers?” (Bagger 1993, p.2)

It is further argued, that the lay-offs at Dancall will hit Northern Jutland hard. By the end of September 1993 work is resumed in the company, now called Dancall Telecom in Pandrup (Politiken 1993). Berlingske Tidende reports the 6th of October 1993 that Amstrad, which owns Dancall Telecom, has had a surplus in the year 1992-1993 of 20,5 million GBP compared to 70,7 the year before (Henderson 1993).

8.6.4.1 Amstrad brings business capabilities to Dancall

Berlingske Tidende reports the 28th of November that already two months after the takeover by Amstrad, expenses in the company have been reduced (Wormslev 1993b):

”The buildings are the same. The products likewise. And all of the employees were here before. Nevertheless, Telecom is not a new Dancall. When the Amstrad corporation in the middle of September put 65 million DKK on the table and took over the ailing mobile phone company in Northern Jutland after the company went into receivership a month and half prior, it quickly became clear to the new management that the structure, both the big picture and the details had to be changed, if the investment should be profitable. »It is my clear impression that the old Dancall had no control whatsoever of their costs,« says Dancall Telecom’s CEO Bob Watkins”

”Bygningerne er de samme. Produkterne lige så. Og samtlige ansatte var her også før. Alligevel er Telecom ikke et nyt Dancall. Da Amstrad-koncernen midt i september lagde 65 mill. kr. på bordet og overtog den kriseramte nordjyske mobiltelefon-fabrik efter halvanden måneds betalingsstandsning, stod det hurtigt den ny ledelse klart, at strukturen - både på de store linjer og på detaljerne - måtte laves om, hvis investeringen skulle være rentabel. »Det er mit klare indtryk, at det gamle Dancall intet styr overhovedet havde på omkostningerne,« siger Dancall Telecoms administrerende direktør, Bob Watkins.” (Wormslev 1993b, p.3)

Here we see, that people from outside the area, in this case Bob Watkins with 17 years of experience in Amstrad, focusing on business, is surprised by the lack of focus on business in Dancall. This fits again with the point made by the founders of Cetelco, that both Cetelco and Dancall lacked the business capabilities needed for success.

The production manager in the company, with 10 years of experience in Dancall, is also quoted for saying in the article, that “Vi var alt for lidt bevidste om, hvad tingene kostede” – “we paid far

too little attention to what things cost" (Wormslev 1993b, p.3). The number of employees has risen to 305 at the time, which is a faster rise than expected, according to the article, and the goal is to produce and sell 100.000 phones in 1994, of which 90% are expected to be the analogue NMT phones and 10% the digital GSM phones which became the nemesis of Dancall. Just as Cetelco was making both GPS receivers and phones due to the similarity in the needed production facilities, so does Dancall Telecom contemplate new product lines such as electronic equipment to satellite receivers and maritime communications equipment, because the company has the needed production facilities, according to the article. The article also explains that the pressure on the production has been increased, and the salaries lowered:

"KAD, SiD and Dansk Metal have just entered into an agreement with Dancall Telecom about an accession agreement to CO-Metals agreement. »Not all the girls could immediately understand that they need to work harder for less pay. But I have told them that right now it is first and foremost about preserving jobs. When the factory is up and running solidly again, then we can talk bonuses and other perks with the new owner,« says Aalborg-chairman of Female Workers' Federation, Jonny Barchow. She does not perceive the new working conditions as an attempt to transfer a lower English inspired wage level to Denmark. »With Dancall's history they are of course a little careful,« says Jonny Barchow, who perceives Amstrad's only representative at Dancall Telecom, CEO Bob Watkins, as »a good, solid collaborator, that we can trust.«

"KAD, SiD og Dansk Metal har netop med Dancall Telecom indgået en tiltrædelses- overenskomst til CO-Metals aftale. »Ikke alle pigerne kunne umiddelbart forstå, at de skal arbejde hårdere og have mindre for det. Men jeg har sagt til dem, at nu handler det først og fremmest om at redde arbejdspladser. Når fabrikken igen kommer til at køre solidt, må vi så snakke bonus og andre goder med den ny ejer,« siger Kvindeligt Arbejder Forbunds Aalborg-formand, Jonny Barchow. Hun opfatter ikke de ny arbejdsvilkår som et forsøg på at overføre et lavere, engelsk-inspireret løn-niveau til Danmark. »Med Dancalls historie er de naturligvis lidt forsigtige,« siger Jonny Barchow, der opfatter Amstrads eneste repræsentant på Dancall Telecom, administrerende direktør Bob Watkins, som »en god, solid samarbejdspartner, vi kan stole på.«" (Wormslev 1993b, p.3)

This distinction between R&D work, which is seen as the core, and the production work using low-skilled, mainly female workers is increased over time.

Two months later, Politiken announces that the acquisition has been a success for Dancall, and that the new foreign owners have created new optimism and several hundred new workplaces in the so-called "Doomsday threatened Mobile Phone Industry" (dommedagstruede mobiltelefonindustri) (Højbo 1994). Furthermore, the message is that the new owners believe that the Danish industry is capable of overtaking Asian competitors in the field. Dancall Telecom now employs 320 people, and the now completely German owned Cetelco is back to an almost complete workforce, like before the German acquisition, with 320 people. An important point made here is that the marketing director from Dancall Telecom argues that it is possible that production can be pulled back from Asia:

" - the interesting thing is, that the production might be pulled back from the East again. New mobile phones are not particularly wage intensive, says head of markets Lars E. Bisgaard, Dancall. According to the head of markets wage cost are now only about 5-10% of the price of a mobile phone. Just two years ago salaries were 30% of cost. At the same time, Lars E. Bisgaard expects costs to raise in for example China and Korea in the next couple of years."

" - Det interessante er, at produktionen muligvis kan trækkes tilbage fra Østen igen. Nye mobiltelefoner er nemlig ikke særlig løntunge, siger markedschef Lars E. Bisgaard, Dancall. Iføl-

ge markedschefen udgør lønomkostningerne nu kun omkring 5-10 procent af prisen for en mobiltelefon. For blot to år siden udgjorde lønningerne 30 procent. Samtidig regner Lars E. Bisgaard med, at omkostningerne i f.eks. Kina og Korea vil stige i de kommende år.” (Højbo 1994, p.1)

It is further explained that the most important expenses is development cost as well as cost of components, and that the acquisitions have meant that the companies now have access to cheaper components, and finally, the foreign owner have the needed capital, capital that the Danish owners could not amass. The article further explains that the crisis mood, which followed from the bankruptcy of Dancall, has resulted in the creation of a committee, which are to give recommendations on how to create jobs in Northern Jutland.

Ritzaus Bureau the 27th of January 1994 (Ritzaus Bureau 1994b) publishes an article, which further supports the argument that Dancall lacked marketing capabilities. This time the argument is that Dancall apparently misread the market before the acquisition. The message is that Dancall stops production of the GSM phone Dancall Logic. This car-phone was suppose to be sold for 13.000 DKK i piece, but can only be sold for 3000 DKK today, making this phone, which has cost 80 million in R&D expenses and been one of the company’s flagship projects, far too expensive. The phone was put on sale in 1993, as a product aimed at the picky user, but as explained in the article, quote “The development overtook the phone in several ways” (udviklingen løb fra telefonen på flere måder) (Ritzaus Bureau 1994b, no page number). When it was put on sale, the GSM net was only partially finished in Denmark, and when it reached full coverage, competitors had phones which were smaller and most importantly cheaper. After the acquisition by Amstrad production has continued until the stock of parts are used.

Ritzaus Bureau 28th of January (Ritzaus Bureau 1994a) brings an article with the heading “Warning from the electronics industry in Northern Jutland is called off” (Alarm fra den nordjyske elektronikindustri afblæst). The message is that the region is doing well, Dancall Telecom is doing well, and there is a possibility of obtaining support from the EUs structural funds for the so-called nerve centres of the electronic industry in Northern Jutland, which is Pandrup and Støvring municipalities, i.e. the homes of Dancall Telecom and Cetelco. This is according to the article the background for a committee which has been created to investigate the possibilities of creating new jobs in the region. And the message is that although the development is now positive again, the question is whether the foreign companies will acquired the know-how in the region and then pull-out:

“Even though the optimism has returned, business people and especially politicians are not entirely at ease. In the long term, the question remains whether the foreigners are just draining Northern Jutland for knowledge and know-how, to subsequently close down and move to low-cost countries in the Far East and Eastern Europe, or if the people from Northern Jutland on the contrary, through a favorable business and research environment can survive and maybe even maintain real production, not just development, in the area. As the development is right now, the answer is distinctively positive; the foreign dominance seems to strengthen Northern Jutland.”

“Selv om optimismen er vendt tilbage, er erhvervsfolk og især politikere ikke helt rolige. På lidt længere sigt er spørgsmålet, om udlandet malker Nordjylland for viden og know-how for derefter at lukke og slukke og flytte til billiglandene i Fjernøsten og Østeuropa eller om nordjyderne tværtimod i kraft af et gunstigt erhvervs- og forskningsmiljø overlever og måske endda fastholder egentlig produktion - ikke kun udvikling - i området. Som udviklingen er i dag er svaret klart positivt, den udenlandske dominans ser ud til at styrke Nordjylland.” (Ritzaus Bureau 1994a, no page number)

According to the article, Amstrad acquired Dancall because it saved them at least two years of catching up in relation to the development work. Furthermore, it is argued by the marketing director at Dancall Telecom that the company aims to maintain both development and production in Pandrup, because the combination of development and production holds certain advantages, and a continuously more efficient production makes a low wages production workforce less important (Ritzaus Bureau 1994a)

The conclusion of the report on how to support Northern Jutland is also reported in Berlingske Tidende 29th of January (Wormslev 1994c). The conclusion is that an investment company is created which shall channel money from institutional investors to small and medium sized companies in Northern Jutland, a category which will otherwise be overlooked. According to Berlingske Tidende the 1st of February 1994 the plan is received with disappointment in Northern Jutland, where it is seen as lacking innovative aspects (Wormslev 1994b).

The lacking business competences in the Danish telecommunication companies are articulated again in Ingeniøren the 25th of March 1994, in an article about the closure of Philips mobile phone activities in Denmark (Ingeniøren 1994a):

"Foreign ownership of the previously so successful Danish factories for developing and manufacturing mobile phones is today more often the rule than the exception. It has often been the only alternative to survival. However, in several cases, it eventually led to closure – inertia in the decision making phase, a tendency to rest too long on the laurels, a lack of targeted marketing and problems with converting a niche-product into a consumer product in mass production.

According to head of development Birger Jürs, Philips Radio Kommunikations Industri A/S, these are some of the weak points, that the mobile phone industry at home suffers under. – We do not take the consequences early enough. We kept the unprofitable production for too long, he says. Birger Jürs knows 'where the shoe pinches': A short while ago, the Dutch group Philips announced that it was stopping development and production of mobile phones in Denmark. And 150 people were fired and the development department with 60 people, including about 40 engineers was put on the sales list. At the time of writing the development department has still not been transferred to another producer of mobile phones, but as suggested by Ingeniøren 10/94 it is highly likely that the Finnish telecom corporation Nokia is in the picture. Nokia is Europe's largest mobile phone producer."

"Udenlandsk ejerskab af de tidligere så succesfulde danske fabrikker til udvikling og fremstilling af mobiltelefoner er i dag mere regelen end undtagelsen. Det har ofte været eneste alternativ til overlevelse. I flere tilfælde har det dog på sigt ført til lukning - Træghed i beslutningsfasen, tendens til at hvile for længe på laurbærrene, mangel på målrettet markedsføring, og problemer, når en nicheproduktion skal konverteres til konsumentvare i volumenproduktion.

Det er ifølge udviklingschef Birger Jürs, Philips Radio Kommunikations Industri A/S, nogle af de svage sider, som mobiltelefonindustrien herhjemme lider under. - Vi drager ikke konsekvenserne tidligt nok. Vi beholder den urentable produktion for længe, siger han. Birger Jürs ved hvor skoen trykker: For kort tid siden meddelte Philips, at den hollandske koncern stopper udvikling og produktionen af mobiltelefoner i Danmark. 150 blev fyret, og udviklingsafdelingen på 60 mand heraf ca 40 ingeniører blev sat på salgslisten. I skrivende stund er udviklingsafdelingen endnu ikke overført til en anden producent af mobiltelefoner, men som antydnet i Ingeniøren 10/94, er den finske telekoncern Nokia sandsynligvis inde i billedet. Nokia er Europas største producent af mobiltelefoner." (Ingeniøren 1994a, p.28)

The issue of employment in Pandrup is articulated in Ekstra Bladet the 28th of August 1994 (Kanstrup 1994). The message is that Pandrup municipality has been known as a "sea of unem-

ployment" in Denmark since the 1950's, but now the region is doing well, and the acquisition by Amstrad has giving the region new hope for future employment. The number of employees at Dancall Telecom has now reached 400, and the company has positive expectations for the future.

One thing is the rising number of jobs for unskilled workers in the production, another is the need for engineers for R&D, and the companies lack people, as reported by for example Ritzaus Bureau the 31st of August, which articulates that 200 engineers from other places in Denmark are visiting North Jutland as a result of an invitation from job centres in the region, who have not been able to find the number of engineers which Dancall and other companies require (Ritzaus Bureau 1994c). The lack of engineers in Northern Jutland is also articulated in Ingeniøren the 2nd of September (Ingeniøren 1994b).

Politiken publishes an article the 12th of October 1994 with the heading "The thought factory in Northern Jutland" (Den nordjyske tankefabrik) (Holmstad 1994a). In this article the distinction between technology and business is articulated again, but in a different way. It is, through the voice of Knud Rindum, CEO of NOVI, argued that companies in the telecommunication industry are blooming around Aalborg, and there is a strong belief in the idea of the lonesome inventor who creates something in his cellar, which turns into a huge company. This is, however, according to Knud Rindum a romanticized view of reality, and there are only few examples of this happening in reality. Therefore NOVI spends a lot of effort on convincing successful entrepreneurs, who are dreaming about having their own companies and acting as CEOs that they have to sell their ideas to existing companies who have sales and marketing competences. As he argues, "Researchers and inventors are neither sales people nor CEOs by the grace of God" (Forskere og opfindere er hverken sælgere eller virksomhedsledere af Guds nåde) (Holmstad 1994a, p.5). One place where researchers often have a wrong view of reality is in relation to costs, according to Knud Rindum. This argument fits well with earlier arguments in articles about how Dancall did not have the necessary focus on costs.

Berlingske Tidende reports the 11th of November that Dancall Telecom got a surplus of 15 million DKK the first year after the acquisition by Amstrad (Wormslev 1994a). And the argument that the region is doing well is rearticulated in Berlingske Tidende on the 21st of November in an article with the title "Pandrup back on its feet again" (Pandrup på fode igen) (Berlingske Tidende 1994), in which it is argued, quote:

"1995 heralds better times for the Pandrup area in Northern Jutland which for years have dragged around the title as the worst unemployment area in the country. The local electronics industry is experiencing growth nobody had dared hope for and AF Nordjylland [Job Center] has been asked to find over 300 new employees, predominately unskilled, within the next six months."

"1995 indvarsler lyse tider for Pandrup-området i Nordjylland, som i årevis har måttet slæbe rundt med titlen som landets værste arbejdsløshedsområde. Den lokale elektronikindustri oplever en vækst, ingen havde turdet håbe på, og AF Nordjylland er blevet bedt om at finde over 300 nye medarbejdere, fortrinsvis ufaglærte, inden for det næste halve år." (Berlingske Tidende 1994, p.1)

The argument about growth and positive future prospects for the region is also articulated in Politiken the 14th of December (Holmstad 1994b) and in B.T. the 18th of December (Kvist 1994), and now it is not only an argument of growth at Dancall and new workplaces in the region which is articulated, it is also articulated that now Dancall will start competing with the large players in the industry such as Nokia and Ericsson:

"Only 15 months after it changed owners and mass layoffs followed, mobile phone producer Dancall Telecom in Northern Jutland is back on its feet and ready to fight the big international producers such as Nokia, Ericsson and Motorola. Dancall is launching new mobile phones and wireless devices in the new year and there is talk of mass production on a previously unprecedented scale. – We are moving from serial production to mass production"

"Kun femten måneder efter ejerskifte og massefyringer er den nordjyske mobiltelefon-producent, Dancall Telecom nu så meget på fode, at man er parat til at slå med de tunge, internationale producenter som Nokia, Ericsson og Motorola. Dancall lancerer nye mobiltelefoner og trådløse apparater i det nye år og taler om masseproduktion i hidtil uhørt omfang. - Vi bevæger os fra serieproduktion til masseproduktion." (Holmstad 1994b, p.1)

The is rearticulated in Politiken the 1st of March 1995 (Holmstad 1995b):

"Dancall Telecom in Northern Jutland which is owned by the English Amstrad corporation, is declaring war in a few days against the foreign giants on the insatiable mobile phone market. On the 8th of March the pandrup-based company will reveal a brand new GSM-mobile phone at the biggest European computer fair, Cebit in Hannover. The small pocket phone will reportedly be able to compete with the big, foreign phone producers' models. Both on size and on price."

"Nordjyske Dancall Telecom, der ejes af den engelske Amstrad-koncern, melder om få dage krig mod de udenlandske giganter på det umættelige mobiltelefon-område. 8. marts vil Pandrup-virksomheden afsløre en splinterny GSM-mobiltelefon på Europas største edb-messe, Cebit i Hannover. Den lille lommefunk bliver ifølge forlydender i stand til at konkurrere med de store, udenlandske telefonproducenters modeller. Både i størrelse og i pris." (Holmstad 1995b, p.6)

The discourse thus changes, now it is not a matter of survival for Dancall, now it is a matter of competing with the largest players in the industry. The growth continues, and in the summer of 1995 it is announced in Berlingske Tidende, the 16th of June, that Dancall Telecom is looking into both new markets and new products (Wormslev 1995). Dancall Telecom has made a new venture which will, according to the article, bring the number of employees past a 1000. The new focus is wider both technologically, where focus will be expanded to include special large-city phones on the PCN-net as well as GPS phones, and market-wise, where the company will put focus on China, India and USA. So we see a situation where the company has, as we saw earlier, misunderstood the market for GSM phones in Scandinavia, but nevertheless, the company is now expanding to the large markets in China, India and the USA.

The impact in Pandrup is also rearticulated in the article, where the trade promotion officer in the municipality argues that 500 new jobs at Dancall will create at least 500 more in the areas surrounding Dancall. We see here, that the municipality is articulating that they see Dancall as the saviour of the region, Dancall is articulated in a way where it becomes the core driver in the rise of the region. It has made the region a so-called "paradise for engineers", and as argued in earlier articles, not only engineers are thriving because of Dancall, also unskilled workers are getting new jobs at the growing production facilities. Politiken announces in an article the 17th of June that Dancall Telecom has more than 500 employees and expect to hire 250 more before the end of the year (Holmstad 1995a).

Ritzaus Bureau announces the 5th of July 1995 that after a meeting in the board of directors in Amstrad, Dancall Telecom has gotten permission to go ahead with an investment on 225 million DKK, which will increase the number of employees from 500 to 1.000 people (Ritzaus Bureau 1995). The goal is to increase the production 20 times by the end of the following year. This is

also articulated in Berlingske Tidende and Politiken the following day (Berlingske Tidende 1995; Politiken 1995).

8.6.4.2 The future of Dancall Telecom is bright but business is not going well

Despite the positive newspaper articles about Dancall following the acquisition, Politiken announces the 10th of January 1996 that Dancall Telecom ended the fiscal year 1995/1996 with a deficit of 27 million DKK (Jensen 1996b). One of the things leading to this has been the increasing cost of salaries, according to the article. The article further states, that Dancall Telecom has had problems with reaching a production of 100.000 mobile phones per month, and this has made the board of Amstrad hesitant about approving the 225 million DKK investment announced in the summer. An article in Politiken the 24th of January 1996 presents an image of the industry in Northern Jutland (Jensen 1996a). According to this article a so-called fertile cooperation between industry and university has created a small electronic fairytale. This article rearticulates the discourse about technology as the core of the cluster, and Aalborg University as a key driver:

"The focal point for the mobile phone industry in Northern Jutland is naturally enough the education to electronic engineer at Aalborg University, not least the Center for Personal Communication. Renowned Professor Jørgen Bach Andersen has created a fertile environment in the intersection between educational institution and industry, where the focus is on goal-oriented research without any academic fear of contact."

"Omdrejningspunktet for den nordjyske teleindustri er naturligt nok elektronikingeniør uddannelserne på Aalborg Universitet, ikke mindst Center for Personlig Kommunikation. Den ansete professor Jørgen Bach Andersen har her skabt et frodigt område i overgangen mellem uddannelsesinstitution og industri, hvor der uden akademisk berøringsangst satses på resultatorienteret forskning" (Jensen 1996a, p.5)

The article furthermore articulates that Dancall will now end the production of NMT phones and focus on GSM, and the mission is to capture 10% of the European GSM market. This indicates, again, a change in market focus, away from the USA, China and India, and back to Europe. The article then describes the growing market for mobile phones, but instead of dwelling on how the company will obtain the market share of 10% the article focuses on the technological issues.

"CEO Jan Nottelmann, Cetelco, believes that it costs between 60-70 man-years and just as many millions to develop a GSM-phone from scratch today. - This places great demands on the development department, if you want to compete in this market. You need to use the latest technologies and components to create the very small and light devices that sell. That is also one of the reasons that it is very difficult for different and new producers to enter the market, says Jan Nottelmann."

"Administrerende direktør Jan Nottelmann, Cetelco, mener, at det koster 60 til 70 mandeår og ligeså mange millioner at udvikle en GSM-telefon fra bunden i dag. - Det stiller store krav til udviklingsafdelingen, hvis man vil være med på det her marked. Man skal anvende de nyeste teknologier og komponenter for at skabe de meget små og lette apparater, som der er salg i. Det er også en af grundene til, at det er meget svært for andre og nye producenter at komme ind på det her marked, siger Jan Nottelmann." (Jensen 1996a, p.5)

This fits well with the prevailing understanding of business, which was discussed earlier, where business was seen as finding and producing the next killer application, not an issue of finding markets and making a profit.

The article also describes the state-of-affair in Cetelco. Cetelco has, in line with what we saw earlier in the Dancall case, misunderstood the market with their last phone, which ended up being too heavy and expensive:

"The next (and perhaps last) call is the company's new super-light GSM-phone, which is expected to be launched this spring. Cetelco's previous GSM phone, a second generation version, was a failure, because it was too expensive and too heavy. All production was stopped in December 1994 and the parent company Hagenuk GmbH had to pump approximately 157 million DKK into the company in 1994 to cover the losses."

"Næste (og måske sidste) udkald bliver virksomhedens nye, superlette GSM-telefon, som ventes på markedet i løbet af foråret. Cetelcos forrige GSM-telefon, en 2. generations udgave, blev en fiasko, fordi den var for dyr og for tung. Al produktionen blev stoppet i december 1994, og moderselskabet Hagenuk GmbH måtte i 1994 pumpe godt 157 mill. kr. i virksomheden for at dække tabene." (Jensen 1996a, p.5)

So in these articles we see an articulation of technology as the core of the cluster, and technology as the core of Dancall, i.e. the challenge ahead will be a technological challenge, and at the same time an articulation of the fact that Dancall is running with a deficit. This continues, and the way out of the deficit is, according to the articles, increased spending on R&D. So here the argument that R&D, i.e. technology development, will solve the business problem, i.e. the deficits, is articulated again.

Berlingske Tidende announces the 11th of September 1996 that Amstrad has had a deficit again, and to turn this around the corporation will focus more on amongst other things, mobile phones, and thereby Dancall Telecom, and will put more money into R&D on GSM (Theils 1996b). The argument that Amstrad will put more emphasis on Dancall Telecom is articulated again in Berlingske Tidende the 24th of September, and in this article it is explained that Amstrad also want to produce decoders for digital TV in the factory in Pandrup (Theils 1996a).

Jyllands-Posten articulates the discourse about missing capabilities in understanding the market again in an article the 23rd of October 1996. This time it is Dancall Telecom who has missed the market, with their new phone Dancall Easy HP 2731, which is too heavy compared to the competitors (Jyllands-Posten 1996a):

"A nice, small compact phone. Fits comfortably in the hand and in the pocket and it has a decent menu system and good sound. Unfortunately, Dancall newest pocket phone is a just a little bit late to really break into the exclusive group of the very best mobile phones. The weight is just a bit too much."

"En fin, lille, kompakt telefon. Ligger godt i hånden og i lommen og har et udmærket menu-system og god lyd. Men desværre er Dancalls nyeste lommetelefon lidt for sent på den til virkelig at slå igennem i den eksklusive gruppe af de allerbedste mobiltelefoner. Vægten er nemlig i overkant." (Jyllands-Posten 1996a, p.8)

8.6.4.3 Dancall becomes the saviour of Pandrup: Affirmative action from the public actors

The link which is constructed discursively between the success of Dancall Telecom, which is now growing again, and the rise of Pandrup municipality, formerly known as a "sea of unemployment", is articulated in a series of articles through to the end of 1996 and the beginning of 1997 dealing with EU support for Dancall Telecom. The 12th of November (Ritzaus Bureau 1996a) announces, that against Dancall Telecoms own expectations, the company is allowed to receive and keep a "record large" EU grant of 50 million DKK. The funding was originally, according to the article, given to new buildings and new equipment for mass-production. Dancall has not invested in this. But because the executive committee for the EU structural funds objective 2 in

Northern Jutland has feared that the region would otherwise lose the 50 million DKK, they have accepted that Dancall Telecom uses the money for development work instead. The chairman in the committee admits, in the article, that this decision is affirmative action towards Dancall Telecom and thereby Amstrad.

So we see in this the construction of a discursive link between the well-being of Dancall Telecom and the well-being of the region. In other words, the fate of Dancall and the region converge. The same news is published in Berlingske Tidende, Jyllands-Posten and Politiken the 13th and in Computerworld the 15th of November (Berlingske Tidende 1996b; Computerworld 1996; Jyllands-Posten 1996b; Politiken 1996a).

The affirmative action towards Dancall Telecom is met with criticism from another mobile phone company in Northern Jutland, Maxon (Ritzaus Bureau 1996e). Maxon has, according to (Ritzaus Bureau 1996e) no production facilities in Denmark, but a so-called large design and development department with around 80 employees:

“ – The EU funding for Dancall creates unfair competition particularly on the employee side, because Dancall with the subsidies most likely can offer better salaries and better development opportunities, says Maxon’s R&D Director Jens Uggerhøj to Ritzaus.”

“ - EU-midlerne til Dancall giver en unfair konkurrence især på medarbejdersiden, fordi Dancall med støttemidler højst sandsynligt kan tilbyde en bedre løn og bedre udviklingsmuligheder, siger Maxon’s udviklingsdirektør, Jens Uggerhøj, til Ritzaus.” (Ritzaus Bureau 1996e, no page number)

The article further explains, that the “Nordjyske forretningsudvalg” i.e. the Business Committee in Northern Jutland for “EU’s Mål 2-midler” i.e. the EU structural funds objective 2, has recommended that Dancall Telecom receives the funding, and that the decision will be made the coming Thursday. According to the article, Nordjyllands Radio has announced, that a conservative member of the national parliament in Denmark, Lene Espersen, has asked the minister of trade, Mimi Jacobsen, to guarantee that the decision comply with all EU rules, but have not received any answer (Ritzaus Bureau 1996e). The same news is articulated in Aktuelt and in Politiken the 22nd of November (Aktuelt 1996a; Politiken 1996d). The same day (Ritzaus Bureau 1996c) announces that Dancall will not receive a two-digit million Kr grant from the EU:

“The Grant Committee in the Ministry of Business Affairs has decided that the money should be sent back to the EU. The Committee has thereby rejected the dodging maneuver in relation to funding that should have secured the money for Dancall, although the company could not live up to the original conditions.”

“Bevillingsudvalget under Erhvervsministeriet har nemlig besluttet, at pengene skal sendes tilbage til EU. Dermed har udvalget afvist et bevillingsmæssigt krumspring, som skulle sikre Dancall pengene, selvom virksomheden ikke kan leve op til de oprindelige betingelser.” (Ritzaus Bureau 1996c, no page number)

According to the article Dancall Telecom does not receive the funding because the handling of the case has been slow and clumsy:

“My worst fears have now come true. It is very sad for both Dancall and Northern Jutland, that we did not manage to administer the support in a sensible way, says Lene Espersen to Ritzaus. She believes that in reality it was a generous offer from the EU to create new jobs in Northern Jutland among other things, which Denmark has abused. – First they got a late start, then they lagged behind on the processing of the application, and now we see, that they

have messed up again, so we have to send back 32 million DKK with a thank you note. People must be laughing at Denmark around the EU, believes the conservative politician.”

“Mine værste anelser har nu vist sig at holde stik. Det er meget sørgeligt for både Dancall og Nordjylland, at man ikke evner at administrere støtten på en fornuftig måde, siger Lene Espersen til Ritzau. Hun mener, at der i virkeligheden er tale om et gavmildt tilbud fra EU til at skabe nye arbejdspladser bl.a. i Nordjylland, som Danmark har misbrugt. - Først kom man for sent i gang, så haltede man bagefter med behandlingen af ansøgningerne, og nu ser vi, at man igen har kludret, så vi må sende 32 mio. kr. retur med tak for lån. Man må grine af Danmark andre steder i EU, mener den konservative politiker.” (Ritzaus Bureau 1996c, no page number)

Here we see the articulation of the link between Dancall Telecom and the existence of workplaces in Northern Jutland; according to the article, Lene Espersen argues that in reality the funding was meant for workplaces in Northern Jutland (Ritzaus Bureau 1996c).

The same day (Ritzaus Bureau 1996g) reports that Dancall Telecom is deeply shocked by the decision, and that it will have consequences for the company, now employing 645 people, according to the CEO Peter Hinrup. Dancall Telecom has currently spent 18 of the 50 million they were promised, and they therefore lose 32 million. And Peter Hinrup also articulates the link between Dancall and workplaces in Northern Jutland, by arguing that this is not only a loss for Dancall Telecom but for the whole region and Denmark:

” – I do not understand why the Grant Committee wants to return the money to Brussels. That way neither Dancall, Northern Jutland nor Denmark benefit from them, believes Peter Hinrup.”

“- Jeg forstår slet ikke, at Bevillingsudvalget vil sende pengene tilbage til Bruxelles. På den måde får hverken Dancall, Nordjylland eller Danmark gavn af dem, mener Peter Hinrup.” (Ritzaus Bureau 1996g, no page number)

According to the article both county manager Henning Madsen, and the mayor of Pandrup Søren P. Mortensen from the social democrats hopes that Dancall can still receive the funding:

“The Chairman of the business committee in Northern Jutland for EU’s structural funds objective 2, Amtsdirektør Henning Madsen still believes that the money can stay in Northern Jutland.

- Dancall still has the chance of finding a new project before the first of January. But if that is not possible, then there is still the possibility that the money can be channeled to another project in Northern Jutland, says Henning Madsen.

Also Pandrup’s Mayor, Søren P Mortensen (S) fails to understand why the Grant Committee has decided to turn its thumb down at Dancall. The company with its 645 employees the largest in the municipality.

- I do not understand the reasoning that they want to support new construction, but not development. Objective 2 funds are explicitly meant to create new jobs, and that is done only through developing new marketable products, believes the Mayor from Northern Jutland.”

“Formanden for det nordjyske forretningsudvalg for EU’s Mål-2 midler, amtsdirektør Henning Madsen, tror dog stadig på, at pengene kan blive i Nordjylland.

- Dancall har stadig chancen for at finde på et nyt projekt inden den 1. januar. Men hvis det ikke kan lade sig gøre, er der stadig den mulighed, at pengene kan gå til et andet projekt i Nordjylland, siger Henning Madsen.

Også Pandrups borgmester, Søren P. Mortensen (S), stiller sig uforstående over for Bevilingsudvalgets beslutning om at vende tommelfingeren nedad over for Dancall. Virksomheden er med sine 645 ansatte kommunens største.

- Jeg forstår ikke begrundelsen om, at man gerne vil støtte nybyggeri, men ikke udvikling. Mål 2- midlerne er netop beregnet på at skabe nye arbejdspladser, og det gør man da kun ved at udvikle nye salgbare produkter, mener den nordjyske borgmester." (Ritzaus Bureau 1996g, no page number)

The article also articulates a difference between Dancall and Maxon:

" – You can glimpse the envy. But Maxon only has its head in Denmark and the entire production in Asia, while Dancall has created a lot of real new jobs, says Søren P. Mortensen. Pandrup Municipality has an unemployment rate of 13% but 10 years ago it was as high as 26%. Dancall can take a lot of the credit for that many people having entered the workforce in the small municipality in Northern Jutland."

"- Man skimter misundelsen. Men Maxon har kun sit hoved i Danmark og hele produktionen i Asien, mens Dancall reelt har skabt en masse nye arbejdspladser, siger Søren P. Mortensen. Pandrup Kommune har en arbejdsløshedsprocent på 13, men for 10 år siden var den helt oppe på 26. Dancall har en stor del af æren for, at så mange flere er kommet i arbejde i den lille nordjyske kommune." (Ritzaus Bureau 1996g, no page number)

We see here that according to the social democratic mayor in Pandrup, Dancall Telecom deserves affirmative action because it is a company with a production line, which creates many new workplaces in the region, whereas Maxon is only the "head" of an Asian company with production in Asia. In other words, a conceptual difference is articulated here: Dancall Telecom supports the region, creates workplaces, and is as such a company which demands and deserves support from public initiations. Maxon does not deserve this. The same message is reported in *Aktuelt* the 23rd of November where the mayor of Pandrup is quoted saying: "Dancall is an important company for the municipality, which ten years ago had a unemployment rate of 26%, but that has now been cut in half" (Dancall er en vigtig virksomhed for kommunen, der for ti år siden havde en arbejdsløshedsprocent på 26, men nu er nået ned på det halve) (*Aktuelt* 1996b, p.12). The message that Dancall Telecom does not get the money is also reported in *Berlinske Tidende* the 23rd of November and here the argument is made a bit more detailed as to why Dancall Telecom did not fulfill the criteria. According to this article, (Wormslev 1996), the building projects planned by Dancall Telecom was stopped because of declining sales. This supports the argument, which has been articulated earlier, that Dancall Telecom has not been capable of meeting the demands of the market, creating phones, which were too heavy and too expensive. Further, the article explains that the falling sales and cancelling of the new buildings also were the reason why Dancall Telecom convinced "Nordjyllands Amt" i.e. County Northern Jutland, who controls the payments, to recommend that the funding was used on different development projects instead. The article also explains that none of the involved parties have clarified the background for the decision to cut the funding, but it is speculated in the article that the decision has to do with competition considerations.

Jyllands-Posten announces the same news the 23rd of November, that Dancall does not receive the funding, but new in this article, (Nordhagen 1996a), is the story that Maxon and Svanehøj International both want to bid for the funding if it is possible:

"Maxon's director of sales Jens Uggerhøj says that the company can quickly be ready with an application for support to expand the company.

And the management of the British-owned company, the pump factory Svaneøj International in Svenstrup has indicated that when Dancall can receive Objective 2 funding, then Svaneøj will not abstain from applying too."

"Maxons salgschef Jens Uggerhøj siger, at virksomheden hurtigt kan være klar med en ansøgning om støtte til en udvidelse af virksomheden.

Og ledelsen af det britisk-ejede selskab, pumpefabrikken Svaneøj International i Svenstrup, har tilkendegivet, at når Dancall kan få Mål 2-midler, så vil Svaneøj heller ikke holde sig tilbage med en ansøgning." (Nordhagen 1996a, p.1)

What is emerging here is a power game between foreign companies in the region, who each have their own specific goals and the county and the municipalities. In their quest for workplaces people from the county and the municipalities discursively made Dancall Telecom the saviour of Pandrup municipality, and a driver behind the successes of telecommunications in Northern Jutland, as the analysis above shows. And thereby they put Dancall Telecom in a situation discursively where they argued that it qualified for affirmative action.

Now we see that other foreign companies react to this intervention by the public sphere. And in the following years, where telecom companies begin to focus solely on R&D and the production is shut down, this difference between the wishes of the companies (i.e. jobs for relatively few highly educated engineers and services for these, for example an international school) starts to clash more and more with the wishes of the county and the predominantly social democratic municipalities i.e. a relatively high number of jobs for both high-qualified as well as unskilled workers as well as services which accommodates the wishes of both groups.

This difference supports a dynamic, which I will come to later, where the companies in NorCOM become explicit about keeping the NorCOM club a privately funded club led by the industry and outside the power of the county, the municipalities and the local university.

The news that Dancall does not get the funding is also brought in Politiken the 23rd of November (Politiken 1996b), and Ritzaus Bureau reports the 25th of November, that Dancall continues the newly planned development projects despite the missing EU funding (Ritzaus Bureau 1996b). According to the CEO the projects are of such importance that the company does not have any choice, and as a result the English owners must funnel more money to the company. Furthermore, he emphasizes development as the central task of Dancall Telecom:

" – But in a company that has exploded employee-wise from 30 to 645 employees in three years, among other things, we simply have not had the energy to build yet. On the contrary, we need research-related armament. Development is the crucial central key in a high-tech company like ours. Bricks and production equipment is not enough, there has to be real content in it, says Peter Hinrup.

Dancall's massive expansion in a few years, has not been without growing pains and problems. But according to Peter Hinrup this trend has been reversing in the past couple of months. The order situation is described as more positive than ever, and it has been decided to increase production to near optimal from the start of the new year."

"- Men på en virksomhed, der bl.a. medarbejdermæssigt er eksploderet fra 30 til 645 ansatte på tre år har vi ganske enkelt ikke haft overskud til at bygge endnu. Derimod har vi brug for forskningsmæssig oprustning. Udvikling er den helt centrale nøgle i en højteknologisk virksomhed som vores. Mursten og produktionsudstyr er ikke nok, der skal være noget indhold i det, siger Peter Hinrup.

Dancalls voldsomme ekspansion over få år er ikke sket uden vokseværk og problemer. Men ifølge Peter Hinrup er udviklingen imidlertid vendt de senest måneder. Ordresituationen betegnes som mere positiv end nogensinde, og det er besluttet at øge produktionen til nær det optimale fra starten af det nye år." (Ritzaus Bureau 1996b, no page numbers)

It is worth noting here that marketing is not mentioned, only technology, because the article states that the new projects is about developing completely new high-tech products. Given the preceding articles dealing with how Dancall has misread the market demands, the lack of discussion about marketing knowledge in Dancall is worth noticing. The same news is reported in Politiken and in Jyllands-Posten the 26th of November, and in the last emphasis is put on the development department in Dancall with 125 employees, and the need for more developers in the future (Nordhagen 1996b; Politiken 1996c).

Jyllands-Posten reports the 4th of December 1996 that Dancall Telecom is blocking EU support to other companies in Northern Jutland, because Dancall Telecom has a right to keep the 32 million from EU until the following summer, even if the company will not use them, and then pay them back at that time (Nordhagen 1996c). Ritzaus Bureau reports the following day, that according to minister of trade, Mimi Jakobsen, the EU funding will not be return to EU, but stay in Northern Jutland (Ritzaus Bureau 1996f). Berlingske Tidende brings the same news the 6th of December, and it is explained:

"At Dancall the CEO is almost despairing, »We are not building the new factory now. And it could be very difficult for us to use all of the EU money. Maybe we might build a little anyway. The problem is that the money a long time ago was earmarked for very specific purposes. Since we applied our market position has changed. Later came an economic crisis here and our owner, the English corporation Amstrad, then did not want to sign a check for the building which would have double our factory area. But the money is ours. We are not handing them over. It will however be difficult to use them for buildings and machines,« CEO Peter Hinrup recognizes."

"På Dancall er direktøren næsten opgivende. »Vi bygger ikke den nye fabrik nu. Og det kan blive meget vanskeligt for os at bruge alle de EU-penge. Måske vil vi alligevel bygge lidt. Problemet er, at pengene for lang tid siden er specificeret til helt specielle formål. Siden vi søgte, er vores markedsforhold ændret. Senere kom en økonomisk krise hos os og vores ejere, den engelske koncern Amstradt, ville så ikke skrive en check ud på det byggeri, der ville fordoble vores fabriksareal. Men pengene er vores. Vi giver dem ikke fra os. Det bliver dog stadig svært at bruge dem til bygninger og maskiner,« erkender administrerende direktør Peter Hinrup." (Sørensen 1996b, p.7)

Another article the same day in that newspaper, (Sørensen 1996c), explains that the Dancall Telecom has started a project to create a larger production facility, and that robots worth 80 million has been acquired. Furthermore it articulates:

"»Research is important in our industry where there is a rapid development. It is completely utterly insane if Pandrup – Northern Jutland- well, Danmark has to return the 32 million DKK be-cause of this case,« says Peter Hinrup. Telecom has now started the research they sought EU-funding for at their own expense. »It may well be that the factory in the long carries out the major construction project,« the CEO says carefully. But then it would be too late to dispose of the controversial EU-funding, which has to be turned into bricks and machines before New Year 1996/97"

"»Forskning er vigtigt i vores branche, hvor der sker en rivende udvikling. Det er fuldstændig, rablende sindssygt, hvis Pandrup - Nordjylland - ja, Danmark må returnere de 32 mio. kr. på grund af den her sag, « siger Peter Hinrup. Telecom har nu for egen regning sat den forskning i gang, som virksomheden ønskede EU-midler til. »Det kan da godt være, at fabrikken på

lang sigt gennemfører det store byggeprojekt», siger direktøren forsigtigt. Men da er det for sent at disponere over den omdiskuterede EU-støtte, som skal sættes i mursten og maskiner inden nytår 1996/97.” (Sørensen 1996c, p.7)

Ritzaus Bureau reports the following day, the 7th of December that it seems that Dancall Telecom will get to keep the EU money after all:

”The company Dancall in Pandrup, appears to be keeping its controversial EU- and state funding for a special mobile phone project after all. According to the Business Secretariat in County Northern Jutland the mobile phone company will nevertheless complete the project with ‘minor temporal and content related adjustments’.”

”Firmaet Dancall i Pandrup ser ud til alligevel at beholde sin omstridte EU- og statsstøtte på 32 millioner kroner til et særligt projekt inden for mobiltelefoner. Ifølge erhvervssekretariatet i Nordjyllands Amt vil mobiltelefon-virksomheden med ‘mindre tidsmæssige og indholdsmæssige justeringer’ alligevel gennemføre sit projekt.” (Ritzaus Bureau 1996d, no page number)

Berlingske Tidende reports the same news the following day (Berlingske Tidende 1996a).

The relationship between the county and municipalities on one side and Dancall Telecom on the other becomes even more clear in Berlingske Tidende the 10th of December 1996, where it is stated that Dancall Telecom has come under high political pressure to carry out a project which can secure that the 32 million DKK from the EU stays in the region (Sørensen 1996a):

”The Mobile phone company Dancall Telecom in Pandrup in Northern Jutland has come under severe political pressure in a case about 32 million DKK worth of EU-funding. Northern Jutland county recommends that the factory before Christmas apply to the Business Promotion Agency and the State’s Grant Committee for permission to exceed the deadline for the completion of the project, it has received funding for. Unless this happens in a ‘adjusted and revised’ form compared to the original two year old application, the money from the EU and the Treasury will not be paid. The message from the county comes because the company is unable to purchase a particular kind of machines and build a major new factory before next summer. The new building has been dropped completely. Instead, Dancall wish to use the funding to purchase another kind of machines than was originally intended. The question remains whether the State’s Grant Committee will approve this change in the project, which is part of the mass production of mobile phones.”

”Den nordjyske mobiltelefon-virksomhed Dancall Telecom i Pandrup er kommet under hårdt politisk pres i en sag om en EU-støtte på 32 mio. kr. Nordjyllands Amt anbefaler, at fabrikken inden jul søger Erhvervsfremmestyrelsen og Statens Bevillingsudvalg om tilladelse til at overskride tidsfristen for at gennemføre sit projekt, som der er bevilget støtte til. Medmindre det sker i en »justeret og revideret« form i forhold til den oprindelige to år gamle ansøgning, bliver pengene fra EU og statskassen ikke udbetalt. Signalet fra amtet kommer, fordi virksomheden er ude af stand til inden næste sommer at indkøbe en bestemt type maskiner og bygge en stor ny fabrik. Nybyggeriet er helt droppet. Dancall vil i stedet have støtten til indkøb af andre maskiner, end bevillingen er givet til. Spørgsmålet er, om statens bevillingsudvalg godkender den ændring af projektet, der er et led i masseproduktionen af mobiltelefoner.” (Sørensen 1996a, p.2)

”Thursday morning last week, the CEO of Dancall said to Berlingske Tidende that it would be difficult to spend all the EU-money that has been pledged. »Maybe will build a little« said Peter Hinrup. Late Thursday afternoon there was a change of heart. Now Dancall suddenly counted on using the EU and State funding. What the project in question was, Peter Hinrup had a hard time specifying. That was the same day as County Northern Jutland’s Business Se-

cretariat had a meeting with Dancall and that night decided to inform the company, that it need to put its thinking cap on as soon as possible and deliver a revised project. » Northern Jutland county has yet to tell us what we need to do,« said the Dancall CEO today.”

“Torsdag formiddag i sidste uge sagde Dancall-chefen til Berlingske Tidende, at det ville blive svært at bruge alle EU-pengene, der er givet tilsagn om. »Måske bygger vi lidt«, sagde Peter Hinrup. Sent torsdag eftermiddag kom en kovending. Nu satsede Dancall pludselig på at gøre brug af EU- og statsstøtten. Hvilket projekt der var tale om, havde Peter Hinrup svært ved at konkretisere. Det var samme dag, som Nordjyllands Amts erhvervssekretariat holdt møde med Dancall og om aftenen besluttede at meddele virksomheden, at den hurtigst muligt måtte gå i tænkeboks og aflevere et revideret projekt. »Nordjyllands Amt har endnu ikke fortalt os, hvad vi skal gøre,« siger Dancalls direktør i dag.” (Sørensen 1996a, p.2)

We see here that the county and the municipalities put a certain amount of pressure on Dancall to make sure the EU money stays in the region and jobs are created in the region. The fate of Dancall is hence tied even closer to the fate of the region in the discourse around development.

Berlingske Tidende announces the 4th of February 1997 that Dancall will receive a so-called giant order on digital decoders, which is, as we should note outside the GSM mobile phone market (Theils 1997a).

Then suddenly the 6th of Marts, Ritzaus Bureau announces that Dancall is close to being sold (Ritzaus Bureau 1997c). Amstrad, who has been struggling with negative financial numbers, has during the preceding six months been interested in selling the company, according to the article, and two potential buyers are currently looking at the company, a German and a Japanese. Despite the discussions about the investment in production facilities the preceding months in different newspaper articles, this article articulates that the main asset in the company is the development department:

“Peter Hinrup recognizes that Dancall Telecom is primarily interesting because of the company’s technological know-how. ‘But we are trying to explain that it would be a major advantage to also take over the production unit, and I view the possibilities of a sale as very positive’, he says.”

“Peter Hinrup erkender, at Dancall Telecom primært er interessant på grund af virksomhedens teknologiske know-how. ‘Men vi prøver at forklare, at det vil være en stor fordel også at overtage produktions-apparatet, og jeg ser meget positivt på mulighederne for at sælge også det’, siger han.” (Ritzaus Bureau 1997c, no page number).

Amstrad paid 65 million DKK for the company, but the ownership has been expensive according to the article, since the company during the preceding two years has had deficits of respectively 20 and 84 million DKK. The CEO of Dancall Telecom expects though, according to the article, a surplus in the current year. Implicitly he mentions lacking marketing capabilities as a factor contributing to this:

”- It has been more difficult than expected to make the Dancall-name stick out in the world. In the long run Amstrad and Dancall are not big enough to compete with the big ones. We need to be part of one of the really big ones with a recognized name, says Peter Hinrup”

”- Det har været sværere end ventet at banke Dancall-navnet fast ude i verden. På sigt er Amstrad og Dancall ikke store nok til at klare kampen med de store. Vi må ind under eet af de rigtig store firmaer med et anerkendt navn, siger Peter Hinrup.” (Ritzaus Bureau 1997c, no page number)

This message is rearticulated in Berlingske Tidende the following day in two articles (Wormslev 1997a; Wormslev 1997c). In (Wormslev 1997c) the discursive link between the situation at Dancall and the situation of the region is rearticulated, as it is explained that the county and municipalities see the forthcoming acquisition as something positive as long as it does not result in less work-places.

"The Mayor of Pandrup is not losing sleep over the fact that hundreds of kilometers away the Brits, Germans and Japanese are currently discussing the future ownership of the largest employer in the municipality; Dancall Telecom. The British Amstrad group that took over with the company's founder had to give up in 1993, is negotiating a sale to partly a German and partly a Japanese electronics giant. »At the bankruptcy the Danish owned Dancall had about 500 employees. Today there are 640 employees, so we have no reason to complain that Dancall ended in foreign hands,« says Mayor Søren P. Mortensen (S).

»I think that Amstrad want to cash in on its investment now that Dancall is making a profit. That is perfectly fair, and I have no fear that a change of owner, in itself will affect the employment in the municipality negatively,« he says."

"Det giver ikke Pandrups borgmester søvnløse nætter, at briter, tyskere og japanere i disse uger hundreder af kilometer borte drøfter det fremtidige ejerskab af kommunens største arbejdsplads, Dancall Telecom. Den britiske Amstrad-koncern, der kom til, da fabrikkens grundlæggere måtte give op i 1993, forhandler om salg til dels en tysk, dels en japansk elektronikgigant. »Ved konkursen havde det danskejede Dancall knap 500 medarbejdere. I dag er der 640 ansatte, så vi har ingen grund til at være utilfredse med, at Dancall kom på udenlandske hænder,« siger borgmester Søren P. Mortensen (S).

»Jeg opfatter det sådan, at Amstrad gerne vil inkassere gevinsten på sin investering, nu da Dancall giver overskud. Det er helt fair, og jeg nærer ingen frygt for, at et ejerskifte i sig selv vil påvirke beskæftigelsen i kommunen negativt,« siger han." (Wormslev 1997c, p.4)

Interestingly, the point discussed is not the type of work places, i.e. high-educated development workers vs. unskilled production workers, but simply the number of workers. This lack of distinction will later put more distance between people in the NorCOM cluster and people in the municipality since the first will see the lay-offs, which I will return to in a while, as something unavoidable and irrelevant as long as the number of highly educated development workers continues to rise, whereas the latter will see the lay-offs of production workers as something negative.

Jyllands-Posten also discusses the forthcoming sale the 7th of Marts, and in this article it is explained that the CEO of Dancall Telecom believes, that potential buyers will be interested in both the know-how of the company as well as the state-of-the-art production facilities (Nordhagen 1997b). However, he also explains, that Dancall Telecom has been too small to compete with the large players, and that the company therefore needs to be acquired by a larger company than Amstrad, because investments are necessary:

"As we are today we would only be able to continue for another three to four years. The price of mobile phones is decreasing and the technology is increasing. We can either become a niche-company or we can grow and become really big. But that demands hundreds of millions worth of investments, distribution world-wide, technology and a brand name. The three positional buyers all have that," says CEO Peter Hinrup, Dancall"

""Sådan som vi er i dag, vil vi ikke kunne være med om tre-fire år. Priserne på mobiltelefoner går ned, og teknologien går opad. Vi kan enten blive en niche-virksomhed, eller også må vi vokse og blive rigtig store. Men det kræver investeringer på mange hundrede millioner kro-

ner, distribution over hele verden, teknologi og et mærkevarenavn. Det har de tre interesse-rede købere," siger adm. direktør Peter Hinrup, Dancall" (Nordhagen 1997b, p.1)

Jyllands-Posten further reports the same day, that Dancall Telecom seeks help at the EU commission, because the company is using patents in the GSM field owned by large foreign companies such as Motorola, Philips, Nokia and Ericsson. These companies demand that Dancall Telecom pays for using these patents, but Dancall Telecom sees the demanded sums as too high (Nordhagen 1997d). Jyllands-Posten also publishes two articles dealing with the sale the 8th of Marts, (Nordhagen 1997g; Sørud 1997), and the message is that the sale of Dancall Telecom is taken calmly, both within the Danish electronic industry and in Pandrup municipality, where the mayor is quoted saying:

""We are pretty indifferent to who owns the stocks in Dancall. As long as we can keep the jobs!""

""Vi er for så vidt lige glade med, hvem der ejer aktierne i Dancall. Bare vi må have beholde arbejdspladserne!"" (Sørud 1997, p.3)

(Sørud 1997) also shows that the municipality as well as the unions believe that a buyer will come, and understand that it is necessary to continue the same deals with the union etc.:

"Of course it would be a major setback if the mobile phone company Dancall with its approximately 700 employees closes, but nobody in the local areas believes that. "I am definitely not worried about the future fate of Dancall. If you go behind the numbers, it becomes clear that the company is not in any kind of coercive situation," states Pandrup's head of business Poul Bjarne Jensen. Local council member and head of the local SiD-chapter, laborer Leif Stevn, from Saltum, shares the same perception. He says that the unions have had no problems with the current English owners of Dancall. During the last four years they have succeeded in bring salaries and working condition to a level comparable to that at other similar work places here [Denmark]

The Agreement continuous

"However, we must make clear that in the event of a potential change of owner, there cannot be any talk of starting over. The members would not understand. Said straight up: the new owners will have to face the fact that they will be bound by the same agreements as we have with the current owners."

"Naturligvis vil det være et stort tilbageslag, hvis mobiltelefonfabrikken Dancall med sine ca. 700 medarbejdere lukker, men det tror ingen i lokalområdet heller på. "Jeg er i hvert fald ikke bekymret for Dancalls videre skæbne. Hvis man går bag om tallene, fremgår det klart, at virksomheden ikke befinder sig i nogen tvangssituation," fastslår Pandrups erhvervschef Povl Bjarne Jensen. Nogenlunde samme opfattelse har byrådsmedlem og formand for den lokale SiD-afdeling, arbejdsmand Leif Stevn, Saltum. Han fortæller, at de faglige organisationer ikke har haft problemer med de hidtidige engelske ejere på Dancall. I løbet af de sidste fire år er det lykkedes at få løn- og arbejdsvilkårene bragt på niveau med tilsvarende arbejdspladser herhjemme.

Aftaler overtages

"Til gengæld må vi slå fast, at der i forbindelse med et eventuelt nyt ejerskifte ikke kan blive tale om at starte forfra. Det vil medlemmerne ikke kunne forstå. Sagt lige ud: De nye virksomhedsejere må se i øjnene, at de kommer til at overtage de aftaler, som har vi har indgået med de nuværende ejere." (Sørud 1997, p.3)

Politiken also announces the same day that Dancall is close to a sale (Politiken 1997). This situation changes completely the 12th of Marts, where Berlingske Tidende announces that Dancall

Telecom has had a breakthrough, and has presented the Dancall World Phone, which is the first phone in the world which works in both USA, Europe and Japan (Theils 1997b). This is according to Allan Sugar, who owns Amstrad, a breakthrough also compared to Nokia, Motorola and Ericsson, and that Dancall now has a lead of 3-6 months technologically and almost 1,5 years in the market. The rumours that Dancall was to be sold is also dismissed, and it is instead argued that Dancall Telecom will expand, 2-300 new jobs will be created, and the production capacity will be doubled (Theils 1997b). The same news is discussed in two other articles in the same newspaper (Theils 1997c; Wormslev & Theils 1997). The fact that the CEO of Dancall Telecom has been saying in the media that Dancall Telecom was close to a sale, while the owner of Amstrad Allan Sugar denies this leads to confusion in the media, as shown in Jyllands-Posten the 13th of Marts where the issue is discussed under the heading "Confussion about the future of Dancall" (Forvirring om Dancall's fremtid) (Nordhagen 1997e).

The uncertainty disappears on the 1st of April, when Ritzaus Bureau announces that Dancall Telecom will be sold to the German Robert Bosch GmbH, for the equivalent of 960 million DKK (Ritzaus Bureau 1997b). The same day Ritzaus Bureau also announces that the current number of workplaces at Dancall Telecom stays in Pandrup (Ritzaus Bureau 1997a).

8.6.4.4 Dancall is sold to Bosch because of technology

Aktuelt runs an article the following day, (Lund 1997), which also discusses the sale, and it is reported that Bosch did not have any GSM knowledge, and that was why the corporation acquired Dancall Telecom. The 1st and 2nd of April a number of newspaper article emerges all dealing with the sale, and that it is positively received among both workers and in the local municipality, and that Bosch has so-called huge plans for Dancall. As an example of the message in these articles we can take an article in Jyllands-Posten the 2nd of April, in which it is stated, quote:

"The Mobile Phone Factory Dancall Telecom in Pandrup stands in front of a large industrial adventure, after the German Bosch Group has purchased Dancall from the British Amstrad Group for nearly one billion DKK"

"Mobiltelefonfabrikken Dancall Telecom i Pandrup står foran et stort industrieventyr, efter at den tyske Bosch-koncern har købt Dancall af den britiske Amstrad-koncern for knap en milliard kr." –(Nordhagen 1997a, p.1).

It is also stated, as in several other articles at the time that it is expected that the production capability will be doubled from 1 million to 2 million phones a year. The following day Jyllands-Posten reports that Dancall is still seeking to obtain the EU funds discussed above (Nordhagen 1997c).

The 3rd of July Jyllands-Posten announces that the new owner of Dancall Telecom is making big investments in the company (Nordhagen 1997f). A new factory is going to be completed towards the end of 1998, which will cost 311 million DKK and triple the production capacity. Further, this means that Dancall Telecom will not lose the EU funding which has been discussed throughout 1996 and 1997.

"Dancall Telecom's CEO Peter Hinrup is extremely pleased with the expansion: "This is what we have hoped for. That we were bought by one of the really big ones, who want to do something with us," Says Peter Hinrup. Dancall can currently produce one million mobile phones annually, when the factory is running at maximum capacity, and according to Peter Hinrup is the intention to expand so much that it can produce more than twice that. This will happen, among other things through an even more automated production process, however, despite

the introduction of robots the expansion will mean that hundreds of new employees will need to be hired in the coming months. Among other things there is a need for new engineers in Dancall's development department

"Dancall Telecom's direktør Peter Hinrup er særdeles tilfreds med udvidelsen: "Det er det, vi har gået og drømt om. At vi blev købt af en af de helt store, som vil noget med os," siger Peter Hinrup. Dancall kan i dag producere en mio. mobiltelefoner om året, når fabrikken arbejder på højtryk, og ifølge Peter Hinrup er det meningen at udvide så meget, at der kan produceres mere end det dobbelte antal. Det skal blandt andet ske gennem en endnu mere automatiseret produktion, men trods indførelsen af robotter betyder udvidelsen, at der i de kommende måneder skal ansættes flere hundrede nye medarbejdere. Der er blandt andet brug for nye ingeniører til Dancall's udviklingsafdeling" (Nordhagen 1997f, p.5)

Jyllands-Posten reports the 24th of September that Dancall Telecom has started construction of a factory worth 250 million Dkk/DKK, which will also increase the workforce at Dancall Telecom from 650 to between 850 and 1050 employees (Jensen & Langager 1997a). The relationship between Dancall Telecom and Pandrup municipality is articulated again in Jyllands-Posten the same day. Under the heading "Smiles over Pandrup" (Smil over Pandrup) it is argued:

"In Pandrup there is not only good cooperation between the municipality and the companies. Here they are inextricably linked. What is good for business is good for the municipality is the philosophy in the Vesterhavs-municipality in Northern Jutland, where Telecom today accounts for 650 of the municipality's 1600 jobs."

"I Pandrup er der ikke blot et godt samarbejde mellem kommunen og virksomhederne. Her er de uløseligt forbundet. Hvad der er godt for erhvervslivet, er godt for kommunen er filosofien i den nordjyske vesterhavs-kommune, hvor Telecom i dag tegner sig for 650 af kommunens 1600 arbejdspladser" (Jensen & Langager 1997c, p.6)

The article also reports that the relationship between Pandrup municipality and Dancall Telecom is so close, that the mayor refers to Dancall as "us":

"Highly unusual for a Mayor, he himself negotiated personally with a local farmer to buy the six acres of land that Dancall Telecom is now building on. Afterwards, he received Bosch's top management with a big smile, open-faced sandwiches and lager at the city hall, when they visited on first of April this year. The message was clear: "say what you wish for and ye shall have it." With this attitude it is not strange that the mayor consequently refers to Dancall Telecom as 'we'. The Mayor's efforts bring forth smiles on Klokkestøbervej, where Dancall's factory building currently takes up 13000 square meters. The company's financial director Per Hornung Pedersen does not cover up the fact that the mayor's and the city council's very business friendly policies are a major reason why the international industrial giant will continue to bet on the small municipality in Northern Jutland. Per Hornung Pedersen is among other things impressed by the Mayor's purchase of land for the company. "I just called the Mayor and said, now we need to talk about land, friends. When? He asked - this afternoon, I said. The very same day we had a promise for all the land we could ever want. A lot of companies would envy that kind of treatment," says Per Hornung Pedersen."

"Noget usædvanligt for en borgmester forhandlede han sidste år personligt med en lokal landmand for at købe de seks hektar jord, Dancall Telecom nu går i gang med at bygge på. Derefter tog han storsmilende imod med smørrebrød og pilsnere på rådhuset, da Bosch's topledelse besøgte Pandrup 1. april i år. Signalet var klart: "Sig hvad I ønsker, og I skal få det." Med den indstilling er der måske ikke noget underligt i, at borgmesteren konsekvent siger "vi" om Dancall Telecom. Borgmesterens indsats får smilene til at brede sig på Klokkestøbervej, hvor Dancalls nuværende fabriksbygninger breder sig over 13.000 kvadratmeter. Virksomhedens økonomidirektør, Per Hornung Pedersen, lægger ikke skjul på, at borgmesterens og byrådets særdeles erhvervsvenlige politik er stærkt medvirkende til, at den internationa-

le industri-gigant fremover vil satse på den lille kommune i Nordjylland. Per Hornung Pedersen er bl.a. imponeret over borgmestens opkøb af jord til virksomheden. "Jeg ringede bare til borgmesteren og sagde, at nu skal vi snakke jord, venner. Hvornår?, spurgte han - i eftermiddag, sagde jeg. Samme dag havde vi fået lovning på al den jord, vi ønskede. Mange virksomheder ville være misundelige over den behandling," siger Per Hornung Pedersen." (Jensen & Langager 1997c, p.6)

The article illustrates how Pandrup municipality is tying its destiny to Dancall Telecom. And these ties are important, because later, when the company is split up and moved from the municipality, this turns into hostility towards the MNCs, which in turns makes companies in the NorCOM cluster keen to avoid public influence on the business association. The relationship forming in this phase between Dancall Telecom and Pandrup municipality, and the fate of the latter in the first, is shown by a number of facts in the article. The new workplaces which are discussed have caused rising activity by real estate agents, the number of houses being sold in Pandrup is on the rise, and the demand cannot be fulfilled, which is why the municipality has decided to parcel land for 40 new houses. The article also reports that the municipality expects a number of supplier companies to emerge in the region to supply plastic and batteries for mobile phones. It is thus expected that the number of workplaces in the municipality will be doubled to 3.000 within the next 10 years. It is also, according to the article, known in the municipality that with these initiatives the municipality is making itself dependent upon Dancall Telecom, and Dancall Telecom knows this. The chief financial officer of the company argues, according to the article, that Dancall Telecom is going to be the locomotive which will pull Pandrup municipality into the new millennium. The article also explains that given the change from poor countryside municipality to a business centre in Northern Jutland, which the city is currently undergoing according to the article, the services in the city have to be changed, schools have to be updated and 10 millions has already been spent on schools and day-care facilities, cultural life needs new focuses and the municipality needs to make sure that the newcomers do not form enclaves in the city. Therefore a project has been initiated by Pandrup municipality to learn from the experiences of other Danish cities dominated by one large company, in this case, Bjerringbro with Grundfos and Billund with Lego.

The optimism around Dancall Telecom in Pandrup municipality, and the fact that the whole municipality is betting on this one company as the key to a positive future is also the focus of an article in Jyllands-Posten the 1st of November with the heading "Democracy in a grey zone" (Demokrati i en gråzone):

"A mayor who is a "freemason" with the director of the municipality's dominant company. Another, who promises a company building plots over the phone. And a third, who personally, buys land from a local farmer so the region's dominant company can expand. These are just three examples of how politics plays out in the country's smaller municipalities, which houses the country's largest companies. In all cases, local democracy is threatened on its life. This believes associate professor of political science specializing in local democracy, Johannes Andersen, Aalborg University. "They are all pure examples of the undemocratic game for influence taking place in municipalities that rely on a single company. In the examples the political agenda is set by narrow economic business interests rather than shared democratic interests. Based on a democratic view that everyone should be treated equally, it is a very dangerous slippery slope," he says."

"En borgmester, der er logebroder med direktøren i kommunens dominerende virksomhed. En anden, der lover en virksomhed byggegrunde i telefonen. Og en tredje, der personligt handler jord med en lokal landmand, så egnens herskende virksomhed kan udvide. Det er blot tre eksempler på, hvordan det politiske liv udspiller sig i de af landets mindre kommuner, der huser landets største virksomheder. I alle tilfælde er det lokale demokrati truet på livet. Det mener lektor i statskundskab med speciale i det lokale demokrati, Johannes Ander-

sen, Aalborg Universitet. "De er alle rendyrkede eksempler på det udemokratiske spil om indflydelse, der foregår i kommuner, som er afhængige af +en virksomhed. I de eksempler sættes den politiske dagsorden af snævre erhvervsøkonomiske interesser fremfor demokratiske fællesinteresser. Udfra en demokratisk opfattelse af at alle bør behandles ens, er det et særdeles farligt skråplan," siger han." (Jensen & Langager 1997b, p.6)

This article presents the views of Johannes Andersen, who is critical of the situation in Pandrup, and argues that the relationship between top leaders in the municipality, such as the mayor, and the management in Dancall causes the traditional administrative procedures in the municipality to be bypassed, and hence the democracy to be taken out of action. This view is, however, according to the article, not shared by Professor Poul Erik Mouritzen from Odense University who argues, that the situation is not necessarily bad for democracy, and can be positive for both company and municipality, but agrees with Johannes Andersen that it can also pose a danger:

"" It is dangerous if the dependency becomes too great. The company will take the municipality down with it, if it closes. However, a municipality' cannot say no to an expansion and thus jobs either, so they really have no choice, "says Poul Erik Mouritzen"

""Det er farligt, hvis afhængigheden bliver for stor. Virksomheden vil tage kommunen med i faldet, hvis den lukker. Modsat kan en kommune jo heller ikke sige nej til udvidelser og dermed arbejdspladser, så de har i virkeligheden ikke noget valg," siger Poul Erik Mouritzen" (Jensen & Langager 1997b, p.6)

History will show, as I come to later, that the danger of this political influence becomes clear, because after the future decline of Dancall, the municipality seeks to influence Dancall in a direction, which will save a high number of unskilled jobs in Pandrup municipality, but a direction which is wrong according to the companies in the NorCOM association which aims for R&D jobs and hence fewer but more high-skilled jobs. This clash is part of what makes other companies in the cluster careful to avoid public influence on the NorCOM association when it is formed officially in 2000 and during the 2000s, and the close relationship which emerges in 1996-1997 between Dancall and Pandrup hence becomes a part of the key to understand why there is a clear separation between the private NorCOM association and the county, municipalities and parts of the university years later. A boundary which in turns delimits NorCOM from interaction with a large part of the electronics industry in Northern Jutland which joins together in the IT Forum, another association heavily influenced by county and municipalities, as I shall also return to.

Let us for now stay in 1997 where the situation still is golden in Pandrup municipality. The positive view of the future is also shown in Fagbladet the 10th of November in which it is reported that the chairman of the union SiD in Pandrup is "sparkling with optimism", and can report that there are almost no unemployed, and the prospects for the future is bright due to the construction of the new factory (Fagbladet 1997). The article further articulates, that a report from a group of researchers at Aalborg University predicts that within 7-8 years there will be no unemployment in Northern Jutland. Following a number of articles in October and November 1997 dealing with hidden commercials and product placement in a Danish TV-series, amongst other Dancall phones, the bright future for Dancall Telcom is articulated again in Berlingske Tidende the 27th of November, where it is argued, that the goal of Dancall is to be the 5th largest player in the industry, and at least employ 1.200 people by 2001 (Wormslev 1997b). The article further explains that the Dancall name will disappear, and the factory will be called "Bosch Telecom Danmark A/S".

Growth continues, and Ingeniøren reports the 8th of May 1998 that Bosch Telecom needs to be "much larger" to compete, and this is where the Bosch corporation can become important

(Thomsen 1998b). The goal therefore is to double the number of employees in the company so that it reaches 1.440 by the end of 1998:

"The Bosch Group's acquisition of Dancall is according to Peter Hinrup a textbook example of how well an acquiring group and an acquired company fit together. Both had something the other needs: Dancall had proven expertise primarily in the development of GSM phones. Dancall had production know-how too, but in a comparison of batch numbers with the major competitors in the mobile phone market - Nokia, Ericsson and Motorola - the Pandrup company counted as a Lilliputian. The Bosch Corporation had even started GSM development, in parallel the group went on the market with a Bosch GSM phone - initially consisting of Motorola components. When Alan Sugar put Dancall for sale, The Bosch group viewed the Dancall purchase as a shortcut to the GSM world"

"Bosch-koncernens overtagelse af Dancall er ifølge Peter Hinrup et skoleeksempel på, hvor godt en købende koncern og en opkøbt virksomhed passer sammen. Begge har de noget, den anden har brug for: Dancall sad inde med dokumenteret knowhow primært inden for udvikling af GSM-telefoner. Produktions-knowhow havde Dancall også, men i en sammenligning på styktal med som de helt store konkurrenter på mobiltelefonmarkedet - Nokia, Ericsson og Motorola - var Pandrupvirksomheden at regne som en lilleput. Boschkoncernen var selv gået i gang med at starte GSM-udvikling op, hvilket i øvrigt skete parallelt med, at koncernen gik på markedet med en Bosch-GSM-telefon - i første omgang bestående af Motorola-indmad. Da Alan Sugar satte Dancall på salgslisten, så Bosch Dancall købet som en genvej til GSM-verdenen." (Thomsen 1998b, p.3)

This relationship where Dancall originally had strong competences in technology but weak competences in marketing and large scale production is also discussed in another article in that newspaper that day, in which Bent Dalum from Aalborg university gives his view of the impact:

"For those companies in Northern Jutland in the development and production of mobile phones, the heavy foreign investment means a boost of risk willing venture capital. But more than that. The Danish companies mainly have know-how in development and perhaps small-scale production. On the contrary, they are weak, when it comes to both sales channels worldwide, as well as expertise in real mass production. From the Danish side the ideal investor is therefore often a financially strong corporation, which besides money can also contribute something on the sale and production side to the Danish electronics company. This combination of capital and specific knowledge and expertise is more than the Danish capital from employees, which has previously been invested in mobile phone manufacturer Dancall in Pandrup can do. Therefore, Bent Dalum believes that in the future we will have an even stronger foreign domination in the Danish electronics industry."

"For de nordjyske virksomheder inden for udvikling og produktion af mobiltelefoner betyder de store udenlandske investorer en saltvandsind sprøjtning i form af risikovillig kapital. Men mere end det. De danske virksomheder besidder primært knowhow inden for udvikling og måske produktion i mindre skala. Derimod er de svage, når det drejer sig om såvel salgskanaler verden over, som ekspertise inden for virkelig volumenproduktion. Set fra dansk side er den ideelle investor derfor ofte en kapitalstærk koncern, der foruden penge også kan tilføre den danske elektronikvirksomhed noget på salgs- og produktionssiden. Denne kombination af kapital og specifik viden og ekspertise er mere end dansk lønmodtager kapital, som eksempelvis tidligere er investeret i mobiltelefonproducenten Dancall i Pandrup, kan klare. Derfor mener Bent Dalum, at vi i fremtiden får endnu kraftigere udenlandsk dominans i dansk elektronikindustri." (Thomsen 1998f, p.4)

The success of Bosch Telecom is also the focus of a number of articles throughout the end of May and the beginning of June, but so are the increasing shortage of engineers in the region. Berlingske Tidende reports the 16th of August that the high-tech companies are concentrated in the region, and their growth figures are something other industries can only dream about, and quote

"A Danish version of Silicon Valley in California is about to emerge. The collaboration between electronics companies in Northern Jutland is called NorCOM and includes nearly 25 companies with more than 3000-4000 employees"

"En dansk udgave af den californiske Silicon Valley er derfor ved at skyde frem. Det nordjyske samarbejde mellem elektronikvirksomhederne hedder NorCOM og omfatter knap 25 virksomheder med over 3.000-4.000 ansatte" (Stougaard 1998, p.1)

The article further reports that Northern Jutland is getting too small, and the companies have given up hope of attracting enough Danish applicants for the future positions, and they are therefore looking at other countries when strategies for future growth is made. Bosch Telecom is mentioned as an example in this regard. According to the article, the company had 700 employees the first of January 1998, but now the company has 1.400 employees and if things go according to plan the company will hire a further 700-800 people in the coming years according to the production executive at the company. In the article we also see that Pandrup municipality and Bosch Telecom have different objectives:

"And if Bosch Telecom has to compete with giants like Nokia, Ericsson and Motorola, it will have to produce about 100 million phones a year by the year 2000 at its factory in Pandrup near Aalborg. But when staff numbers reached approximately 2,300, the limits for what the small community in North Jutland can handle has probably been reached believes Echart Reihlen. "We are not going to be for Pandrup what Lego is for Billund," he explains. "that is alright when business is good, but if it starts to go bad, the local community becomes too fragile," he said. It is also a problem to recruit. Not so much the hourly paid employees who work in production. But skilled engineers, IT professionals and managers are hard to get. In early 1998 there were around 100 engineers in the development department at Bosch Telecom. Today there is 215"

"Og hvis Bosch Telecom skal op og konkurrere med giganter som Nokia, Ericsson og Motorola, skal der produceres omkring 100 millioner telefoner årligt i år 2000 på fabrikken i Pandrup ved Aalborg. Men når medarbejderantallet når op omkring 2.300, er grænsen, for hvad det lille nordjyske samfund kan klare, formentlig også nået, mener Echart Reihlen. »Vi skal ikke være for Pandrup, hvad Lego er for Billund,« forklarer han. »Det kan måske nok gå, når forretningen går godt, men hvis det begynder at gå dårligt, er det alt for sårbart for lokalsamfundet,« mener han. Samtidig er det et problem at skaffe medarbejdere. Ikke så meget de timelønnede medarbejdere, som arbejder i produktionen. Men kvalificerede ingeniører, IT-folk og ledere er svære at få. I starten af 1998 var der omkring 100 ingeniører i udviklingsafdelingen hos Bosch Telecom. I dag er der 215." (Stougaard 1998, p.1)

Pandrup municipality wants to have jobs, and the workforce in the region is predominantly unskilled. However, what Bosch Telecom increasingly needs are highly qualified engineers. The lack of qualified engineers is, according to the article, the reason why the development of the new mobile phone standard, UMTS, which will replace GSM, will not be conducted in Pandrup but instead at Bosch in Germany.

"And finally, Bosch Telecom Denmark made Bosch in Germany responsible for the development of the future standard for mobile phones, called UMTS. "We simply did not have the resources. This is one of the areas where cooperation with the Bosch Group has its strength," says Peter Hinrup."

"Og endelig har Bosch Telecom Danmark valgt at lade Bosch i Tyskland stå for udvikling i fremtidens standard for mobiltelefoner, kaldet UMTS. »Vi havde ganske enkelt ikke ressourcerne. Det er et af de områder, hvor samarbejdet med Bosch-koncernen har sin styrke,« siger Peter Hinrup." (Stougaard 1998, p.1)

This is a very important point, because we saw earlier in several articles that it was articulated that the acquisition of MNCs was positive because such acquisition brought the capital needed to handle development of new and expensive technologies as well as competences related to marketing and large scale production. Now we see that the development of the new UMTS technology in Bosch is done in Germany, while Bosch Telecom in Northern Jutland continues to focus on GSM. R&D for new technologies is thus located outside the region, but this is seen as something positive from the local site.

Another article in *Ingeniøren* the 13th of November adds to this statement, by proclaiming, that although the companies in the region are successful, they are not resting on their laurels. The point is that now the university along with five companies have joined forces, to develop the next generation of mobile phones, the UMTS standard, quote:

"Industry and research in Northern Jutland has joined forces to develop basic technology for the GSM-successor UMTS. They are not resting on their laurels in Mobilicom Valley – i.e. Northern Jutland - where the electronic companies are known as a dynamic development environment for everything involving mobile communication. University of Aalborg has begun three-year collaboration with five electronics companies in Northern Jutland on UMTS (Universal Mobile Telecommunications System), which is the next generation of mobile communication."

"Industri og forskning i Nordjylland går sammen om at udvikle basisteknikken til GSM-systemets afløser UMTS. De hviler ikke på laurbærrene i Mobilicom Valley – læs: Nordjylland – hvor elektronikvirksomheder er kendt som et dynamisk udviklingsmiljø for alt, hvad der har med mobilkommunikation at gøre. Aalborg Universitet har indledt et treårigt samarbejde med fem elektronikvirksomheder i det nordjyske om UMTS (Universal Mobile Telecommunications System), som er den gæste generation indenfor mobilkommunikation" (Thomsen 1998e, p.13)

The budget of the project is 11 mill. DKK. and the focus is the RF Front End of the phones. It is also emphasized, that GSM is not dismissed, and that competing companies are cooperating on the project. These are ATL Research, Bosch Telecom Danmark, Maxon Cellular Systems, RTX Telecom and Telital R&D Denmark. Each brings in the equivalent of one engineer for the three years the project is running.

The new Bosch Telecom Danmark factory in Pandrup is opened in November 1998, and the prospects for the future look bright. The mayor of Pandrup is quoted saying in one article the 21st of October, that:

"We hope and believe that Bosch Telecom will never regret that they placed the corporation's powerhouse for mobile telecommunications in Northern Jutland," commented Pandrup's Mayor Flemming Jensen"

"»Vi håber og tror, at Bosch Telecom aldrig kommer til at fortryde, at man har placeret koncernens kraftcentrum for mobiltelefoni i Nordjylland,« lød kommentaren fra Pandrups borgmester Flemming Jensen" (Berlingske Tidende 1998, p.5)

But although a number of advantages concerning the location in Pandrup is articulated in the article, another article in *Ingeniøren* the 16th of October reports that the production officer in Bosch Telecom says that these advantages do not mean that future expansions of the production capacity necessarily will be in Denmark (Ramskov 1998a). In *Jyllands-Posten* it is reported the 21st of October that:

"Robert Bosch has thrown the weight in the bowl in Northern Jutland by placing the entire development and production of GSM mobile phones in Pandrup. At Tuesday's news conference the management did leave the door ajar to the possibility of manufacturing phones in Asia, if the sales of the Danish-German phone were to explode over there. The focus on Northern Jutland has had a dramatic effect on employment in the area, because Bosch Telecom has increased the number of employees from 635 at the beginning of the year, to more than 1300 people now. County Mayor Orla Sea (S) could not hide his delight at what he calls the most daring venture of all in Northern Jutland, and the fact that unemployment in Pandrup municipality today is eight per cent compared to 25 percent a few years ago. Board member Dr. Werner Andexser from Robert Bosch expressed himself very optimistically despite a total investment of 441 million DKK in the new factory in Pandrup."

"Robert Bosch har kastet loddet i den nordjyske skål ved at lægge hele udviklingen og produktionen af GSM-mobiltelefoner til Pandrup. På tirsdagens pressemøde åbnede ledelsen imidlertid en dør på klem for, at der også kan produceres telefoner i Asien, hvis salget af den dansk-tyske telefon skulle eksplodere derovre. Satsningen i Nordjylland har haft en dramatisk effekt på beskæftigelsen i området, fordi Bosch Telecom har øget antallet af medarbejdere fra 635 i begyndelsen af året til nu over 1300 ansatte. Amtsborgmester Orla Hav (S) kunne ikke skjule sin glæde over det, som han kalder den mest vovede satsning i Nordjylland overhovedet, samt det faktum, at arbejdsløsheden i Pandrup kommune i dag er på otte pct. mod 25 pct. for nogle år siden. Bestyrelsesmedlem dr. Werner Andexser fra Robert Bosch udtrykte sig meget optimistisk trods en samlet investering på ialt 441 mio. kr. i den nye fabrik i Pandrup." (Nordhagen 1998, p.2)

Following this vein, Ingeniøren reports the 30th of October that the new factory will be too small in 2000, given the growth of the market (Ramskov 1998b).

The following year a number of articles is published in which Bosch Telecom is mentioned, mostly in relation to new phones and in relation to the discussion about the lack of engineers in Northern Jutland, and that the company supports research at AAU as well as benefits from it. Then the 20th of May 1999 Erhvervsbladet reports that after a deficit in the preceding 18 month accounts, the company is now earning money and is making a profit (Carstensen 1999b). The 15^h of June Jyllands-Posten publishes an article headed "Bosch rejects sales rumours" (Bosch afviser salgstrygter) (Jyllands-Posten 1999). According to this article Bosch Telecom is not facing a sale. The rumours of a sale was started, according to the article, by an article in Økonomisk Ugebrev, which states that Siemens and Motorola want to buy the company because Bosch in Germany is struggling with a deficit, and the fact that a small part of Bosch in the USA was sold to Motorola the preceding week.

The discussion emerges again three months later, and now the positive discourse about a bright future for Pandrup has been changes with the heading "Uncertain future for Bosch in Pandrup" (Usikker fremtid for Bosch i Pandrup) brought by Ritzaus Bureau the 22nd of September:

"The future looks uncertain for the 1650 employees in Northern Jutland's largest company, Bosch Telecom in Pandrup, the German owners have begun negotiations with other major companies for a sale or partnership"

"Fremtiden tegner uvis for de 1650 ansatte på Nordjyllands største virksomhed, Bosch Telecom i Pandrup, hvis tyske ejere har indledt forhandlinger med andre store koncerner om salg eller partnerskab" (Ritzaus Bureau 1999b, no page numbers)

The article reports that German newspapers suspect that Bosch will sell all its Telecom division, which runs a deficit. And the news has caused concerns in Pandrup. The uncertainty is enhanced further in Jyllands-Posten the 24th of September, where it is reported that Bosch Telecom Denmark is facing yet another expansion of its production facilities, but the German owners have not

decided where in the world the expansion will be placed or whether it will be done through co-operation with another mobile producer (Nordhagen 1999a). In the German press Siemens is seen as a possible cooperation partner. Bosch Telecom Denmark has now reached 1.700 employees and its maximum capacity, producing 375.000 phones each month. The possibility that Bosch Telecom might be facing a sale to Siemens is articulated again in Jyllands-Posten the 24th of December 1999 (Nordhagen 1999b). At the end of the year, RB-Børsen brings the heading "Siemens wants to buy a part of Bosch in Northern Jutland" (Siemens vil købe del af Bosch i Nordjylland) the 29th of December (RB-Børsen 1999d). The article reports that Siemens wants to buy the development department with more than 350 engineers and that the production with 1.300 employees will likely be sold to a third company. The largest company in Northern Jutland therefore faces being divided into two. If this happens it will, according to the article, mean an uncertain future for the 1.300 employees in the production. The same news is reported in Berlingske Tidende and Politiken the following day (Berlingske Tidende 1999; Politiken 1999).

Jyllands-Posten elaborates upon the situation in an article the 12th of January 2000, according to the article it has been announced in a declaration of intent from Siemens AG, that they wish to acquire Bosch Telecom Denmark, and it has also been announced that there will be a need for both the development department as well as the production in Siemens (Nordhagen 2000e). The situation is uncertain given that Siemens also possesses production facilities in Germany, but the mayor of Pandrup, and the unions, are still optimistic according to the article:

"Siemens already has two factories in the Ruhr area, which currently produce 11 million mobile phones. The factories in Bocholt and Kamp-Lintfort even have the capacity to double their output. But 20 to 35 million mobile phones is still a stretch, and this is where the opportunities lie for the factory in Pandrup. The lengthy negotiations have not dampened the optimism of Mayor Flemming Jansen (V) in Pandrup municipality. However, he claims that he does not know more than can be read in the news papers. "But I have a very firm belief that when Bosch builds 25,000 square meter of factory space, then the production will continue," says Flemming Jansen. The municipality has with Bosch Telecom's takeover of the former Dancall in the spring of 1998 experienced a boom that has brought employment on the former island of unemployment in line with the average for County Northern Jutland. Also the unions are happy, and at SiD one is, like the mayor's office, optimistic. "We see the takeover talks between Siemens and Bosch, as part of the company's development," says Vice-chairman Jørn Madsen. "I believe that at least we will keep the jobs and in a best case scenario expand the production. I certainly do not count myself amongst the pessimists," says Jørn Madsen.

"Siemens har imidlertid selv to fabrikker i Ruhr-området, hvor der i øjeblikket produceres 11 mio. mobiltelefoner. Fabrikkerne i henholdsvis Bocholt og Kamp-Lintfort har dog selv kapacitet til at fordoble produktionen. Men fra 20 til 35 mio. mobiltelefoner er der stadig et spring, og det er så her, at mulighederne ligger for fabrikken i Pandrup. De langvarige forhandlinger har da heller ikke ødelagt optimismen hos borgmester Flemming Jansen (V) i Pandrup kommune. Han siger dog, at han ikke ved mere, end man kan læse i dagspressen. "Men jeg har en helt klar tro på, at når man som Bosch bygger 25.000 kvadratmeter fabrik, så kommer produktionen til at fortsætte," siger Flemming Jansen. Kommunen har med Bosch Telecoms overtagelse i foråret 1998 af det tidligere Dancall oplevet et boom i udviklingen, som har bragt beskæftigelsen i den tidligere arbejdsløsheds-ø op på niveau med gennemsnittet for Nordjyllands Amt. Også fagforeningerne er glade, og hos SiD er man ligesom på borgmesterkontoret optimister. "Vi ser overtagelsesforhandlingerne mellem Siemens og Bosch som et led i virksomhedens udvikling," siger næstformand Jørn Madsen. "Jeg tror på, at man mindst fastholder arbejdspladserne, men at man i bedste fald udvider produktionen. Jeg er i hvert fald ikke at tælle blandt pessimisterne," siger Jørn Madsen." (Nordhagen 2000e, p.3)

Approximately a month later, the issues hit the media again, with the heading "Third change of owner in four years" (Tredje ejerskifte på fire år) in Politiken the 19th of February:

"It is a large-scale sale Bosch has launched. Mobile Phone Production in Pandrup is sold to Siemens, the production of telephone is sold to American General Electric. Meanwhile, several other activities are removed from Bosch's portfolio. Thus Bosch is finally giving up after several years struggling to profit from their telecommunication investments. In Denmark alone, Bosch Telecom has invested about two billion DKK in the acquisition and expansion of the production of mobile phones. On Friday it was not possible to get comments from Bosch Telecom in Pandrup."

"Det er et regulært storudsalg Bosch har sat gang i. Mobiltelefonproduktionen i Pandrup sælges til Siemens, produktionen af telefonnet sælges til amerikanske General Electric. Samtidig er flere andre aktiviteter på vej ud af Bosch-paletten. Dermed giver Bosch op efter års kamp for at få overskud ud af satsningen på telekommunikation. Alene i Danmark har Bosch Telecom investeret omkring to mia. kr. i købet og udvidelsen af produktionen af mobiltelefoner. Det var fredag ikke muligt at få kommentarer fra Bosch Telecom i Pandrup." (Benson 2000, p.11)

It is described in the article, that the main interest of Siemens is the development department with the engineers. This is repeated in Ritzaus Bureau the 29th of February where it is stated that it is uncertain whether Siemens will acquire the production facilities (Ritzaus Bureau 2000a). Jyllands-Posten deals with the same issue the 4th of Marts, and reports that Siemens has announced that they do not want to own the factory in Pandrup, and that this will be sold to a third company, the name of which is secret at the moment (Nordhagen 2000c). The article therefore proclaims that the jobs in Pandrup are secured.

Ritzaus Bureau announces the 20th of Marts that Siemens has signed the contract which means that they have acquired the 350 development workers in Pandrup (Ritzaus Bureau 2000b). Another unnamed Electronic Manufacturing Service (EMS) company will acquire the factory and produce phones for Siemens. The CEO of Bosch Telecom emphasizes in the article that the sale will not result in mass lay-offs:

"The sale is not expected to mean job losses for any of the 1300 employees in Pandrup. - We are definitely trying to make sure all the employees from Day 1 are offered a job in either one of the two companies. It's 100 percent certain that we are not going to see mass layoffs, or whatever you might imagine, says director Peter Hinrup Bosch Telecom Denmark. - It is certain that it becomes an entirely new situation, when you divide a company that always has always constituted a whole into two parts. A lot of things will be turned upside down. But it all looks very bright, emphasizes the director to Ritzaus."

"Salget ventes ikke at betyde tab af arbejdspladser for nogen af de 1300 medarbejdere i Pandrup. - Vi går helt klart efter, at alle medarbejdere fra dag 1 bliver tilbudt job i enten den ene eller den anden virksomhed. Det er 100 procent sikkert, at vi ikke kommer til at se masseafskedigelser, eller hvad man nu kunne forestille sig, siger direktør Peter Hinrup fra Bosch Telecom Danmark. - Det er klart, at det bliver en helt ny situation, når man deler en virksomhed, som altid har været samlet, over i to dele. Der skal vendes op og ned på mange ting. Men det ser meget lyst ud, understreger direktøren over for Ritzaus." (Ritzaus Bureau 2000b, no page number)

Jyllands-Posten also reports the news of the sale the following day, and adds, that after the acquisition it will be decided whether the development department will be moved to another place (Nordhagen 2000a). Berlingske Tidende as well as Politiken also report the news of the sale that day (Berlingske Tidende 2000;Johansen 2000). The sale however, leads to uncertainty, and Computerworld publishes an article entitled "Pandrup's future uncertain" (Pandrup's fremtid usikker) the 24th of Marts (Troelstrup 2000). The story is, that it has not yet been decided who the buyer for the production facilities will be. The following day Jyllands-Posten announces that

the buyer will be Flextronics International (Rasmussen 2000). This news is repeated in Erhvervsbladet the 27th of Marts and the message is that 1400 people in Pandrup have become part of Flextronics International:

"For Bosch, the continued employment in Pandrup played a major role, said board member Gerhard Kümmel. - Flextronics has a strong market position, and it gives a very positive and long-term perspective for our employees in Pandrup, he says. The director of Flextronics in Western Europe, Ronny Nilsson, is also optimistic. - The deal underlines our position as the number one in EMS in Scandinavia and Europe. The factory in Pandrup is excellent and will allow us to provide our customers with competitive service, his comment says. However, Flextronics have no intentions of putting all their eggs in the "Siemens basket" in the long term. In the longer term it is envisaged that the company will market itself to other customers as well, which is common for an EMS company which can be characterized as an advanced supplier that also takes part in development, distribution, logistics, etc.

"For Bosch har den fortsatte beskæftigelse i Pandrup spillet en stor rolle, oplyser bestyrelsesmedlem Gerhard Kümmel. - Flextronics har en stærk markedsposition, og det giver et meget positivt og langsigtet perspektiv for vore ansatte i Pandrup, siger han. Direktøren for Flextronics i Vesteuropa, Ronny Nilsson, har også de optimistiske briller på. - Handelen understreger vores position som EMS nummer ét i Skandinavien og Europa. Fabrikken i Pandrup er fortræffelig, og vil give os mulighed for at yde vore kunder konkurrencedygtig service, lyder hans kommentar. Flextronics agter på længere sigt ikke kun at lægge sine æg i "Siemens-kurven". På længere sigt er det meningen, at man også vil markedsføre sig overfor andre kunder, hvilket er helt normalt for en EMS-virksomhed, der kan karakteriseres som en avanceret underleverandør, som også tager del i udvikling, distribution, logistik etc." (Carstensen 2000b, no page number)

The sale to Flextronics is reported in a number of other articles the following days. And the news is positive in relation to the future. Jyllands-Posten thus announces the 5th of April that "More people will be involved in making mobile phones in Pandrup" (Flere skal være med til at lave mobil-telefoner i Pandrup), and that the site in Pandrup will become a so-called "Product Introduction Centre" within Flextronics, consequently, a new development department with 50 engineers will be created (Nordhagen 2000b).

Adding to these articles' positive message is Ritzaus Bureau the 3rd of August where it is reported that a Siemens' order worth around 20 billion DKK has been won by Flextronics in Pandrup. This makes the factory the largest electronics factory in the country. This order means that the production facilities will have to be increased to a level where 1 million phones can be produced every month (Ritzaus Bureau 2000c). This message is repeated in a number of articles the following days, and Berlingske Tidende reports the 5th of August that it involves the production of 33 million mobile phones. The article also notes that the order is only a declaration of intent at the moment, not a final order (Evert 2000).

In between the mass of articles dealing with the order, which is considered the largest in Danish history, another one emerges which tells that construction has begun in Nørresundby, at Lindholm Brygge, where Siemens Mobile Phones A/S will be located (Carstensen 2000d). The highly educated engineers are thus leaving Pandrup.

And then the bubble came, which caused a recession in the telecom industry. And this hits Pandrup, as reported in Jyllands-Posten the 21st of June:

"Common to Nokia and Flextronics is it however that the spring has had some nasty surprises in the form of cutbacks and layoffs, mainly felt at the Flextronics plant in Pandrup. Despite the autumn's record order for 33 million mobile phones from German Siemens, in April

of this year around 400 employees had to be fired out of a total of 1200 as a result of the declining sales of mobile phones in Europe. However, the company has announced that it is slowly starting to hire people again – since the 33 million mobile phones order, worth around 20 billion DKK, is still in force.

“Fælles for Nokia og Flextronics er dog, at foråret har budt på slemme overraskelser i form af nedskæringer og fyringer, der især kunne mærkes på Flextronics fabrik i Pandrup. Trods efterårets rekordstore ordre på 33 millioner mobiltelefoner fra tyske Siemens, måtte man i april måned i år fyre omkring 400 medarbejdere ud af i alt 1200 som følge af det svigtende salg af mobiltelefoner i Europa. Selskabet meddeler dog, at man så småt er begyndt at ansætte folk igen - ordren på de 33 millioner mobiltelefoner til en værdi af omkring 20 mia. kr. står nemlig stadig ved magt.” (Sommer 2001, p.7)

This is the beginning of the end for Flextronics in Pandrup, but not for Siemens in Aalborg. Siemens enters the NorCOM environment in and around Aalborg as an R&D subsidiary of an MNC, larger in employee numbers, but still similar in type to many of the other companies in the NorCOM association. Let us therefore leave Siemens and stay with Flextronics in Pandrup. It is the downfall of Flextronics from its peak with 1700 employees, which makes politicians regard the telecommunication industry as dead in the region.

8.6.4.5 Flextronics in Pandrup: A matter of jobs and unskilled workers

From the 1st of January 2000 until the 1 of January 2005 Flextronics is mentioned in 1128 articles, found using the Infomedia database. This is a massive number of articles, which shows that the public awareness of Flextronics was high compared to the awareness of the rest of the cluster. In comparison, the name NorCOM only resulted in 119 articles, even when a search is carried out in all media anytime before the middle of May 2010. Therefore the discourse around Flextronics plays a key role in the history of the NorCOM cluster, because this was where much of the awareness was, from a political and public perspective. And therefore when mass-layoffs occurred, as I will discuss in later, the view among politicians was that the telecommunications cluster was dead, and they therefore focused available funding on other industries and initiatives. This made it difficult for the NorCOM R&D companies to find the funding they needed in the 2000s. Furthermore, the story of Flextronics is important in relation to understanding an additional aspect of the discourses around the NorCOM cluster, namely the ones dealing with a lack of business competences in the R&D companies. As we shall see, the missing understanding of the market is discursively turned into another discussion dealing with the issue of production jobs in a high-wage region.

The articles dealing with Flextronics tells a story which starts out with the articulation of the coming of a bright future in Pandrup but ends with painting a picture of pessimism and despair in Pandrup. Throughout 2000 the so-called giant order for 33 million phones is the focus of a number of articles in different media, which in turn results in optimism in Northern Jutland, as reported in *Ingeniøren* the 8th of September:

“Flextronics’ huge order from Siemens which will multiply the production to 11 million phones a year has raised expectations for the future in Northern Jutland. - Flextronics is a great example of how a cluster evolves, says director Svend Valentin, Knowledge Center Northern Jutland (Novi). - There will be many changes over the next two to three years. Both clients and subcontractors will join, so it will be unrecognizable. Furthermore, it will hardly be harmful to other companies in the same industry. They are too small to operate in the same market. On the one hand, it may cause problems if their subcontractors also have to deliver to Flextronics. On the other hand, these factories can themselves become such subcontractors, he says.”

"Flextronics kæmpeordre fra Siemens, som flerdobler produktionen til 11 millioner mobiltelefoner om året, giver store forventninger til fremtiden i Nordjylland. – Flextronics er et flot eksempel på, hvordan et cluster udvikler sig, siger direktør Svend Valentin, Nordjysk Videncenter (Novi). - Der vil ske mange forandringer i løbet af de kommende to-tre år. Både kunder og underleverandører vil komme til, så det vil ikke være til at kende igen. Desuden vil det næppe være skadeligt for andre virksomheder i samme branche. De er for små til at operere på samme marked, men det kan måske give problemer, hvis deres underleverandører også skal levere til Flextronics. På den anden side kan fabrikkerne selv blive sådanne underleverandører, siger han." (Krøyer 2000b, p.2)

In these articles it is articulated explicitly, that Flextronics draws people to Pandrup, and that the presence of Flextronics shows that there is a belief in the whole area around Pandrup (Bastholm 2001a). Articles also deal with how the presence of Flextronics has created jobs for many previously unemployed people. Thereby it has made life better in the area, compared to when it was known as a "sea of unemployment":

"Today - nine years later - the situation is, to say the least, quite different in Pandrup. Also with the family Højen. Laila has a job at the Danish electronic flagship, the mobile phone factory Flextronics, which in a few years has evolved into Northern Jutland's largest private employer."

"I dag - ni år senere - er situationen mildest talt en ganske anden i Pandrup. Også hos familien Højen. Laila har arbejde på Danmarks elektroniske flagskib, mobiltelefonfabrikken Flextronics, der på få år har udviklet sig til Nordjyllands største private arbejdsplads." (Fagbladet 2000No page number)

And as a result one article names the area Silion Pandrup (Petersen 2000). The use of names referring to the success in Silicon Valley is widespread in articles about the developments in Northern Jutland. Computerworld reports the 11th of December that Flextronics is growing significantly, acquiring new factories worldwide each month (Siegunfeldt 2000a; Siegunfeldt 2000b).

The articles also introduce the term EMS to the readers, and explain the functions this type of companies fulfil, and describe how Pandrup fits into what is called the "production-revolution sweeping throughout the world". In other words, Pandrup is presented as having jumped from nothing to the cutting edge of modern production technology, as argued in Berlingske Tidende the 5th of February 2011 (Evert 2001)

(Evert 2001) also reports how the American owned Flextronics differs from Bosch in relation to organisational issues:

"Flextronics CEO, Peter Hinrup, 48 years old, has been there all the way through the painful Pandrup-story, but today he has difficulties curbing his enthusiasm over the U.S. methods, which have come as a big surprise. "not a bad word about the previous owners, but the difference between then and now is incredible. For example, Bosch sent us a binder with guidelines on how we should work and I often went to Germany to report. The Americans also gave me a book of a 100 pages with their corporate policy, but it turned out that the pages were blank. Bureaucracy, politics and sharp elbows, which are otherwise so common in many organizations, they would have nothing to do with. We have to figure it out ourselves. As long as we make money, we are left to our own device," says the director, who simply applauded when he got the brief and realized that it was not a joke. Peter Hinrup hastens to add that this freedom should not be confused with a lack of interest from the successful company, which since 1993 has gone from 1.5 billion DKK in revenue to over 100 billion DKK last year."

“Flextronics adm. direktør, Peter Hinrup, 48 år, har været med hele vejen gennem den pinagtige Pandrup-historie, men har i dag svært ved at båndlægge sin begejstring over de amerikanske metoder, der har været en stor overraskelse. »Ikke et ondt ord om de tidligere ejere, men forskellen på før og nu er utrolig. Bosch sendte os f.eks. en stribe ringbind med retningslinier om, hvordan vi skulle arbejde, og jeg var tit i Tyskland for at rapportere. Amerikanerne gav mig også en bog på 100 sider med deres virksomhedspolitik, men det viste sig, at siderne var blanke. Bureaukratiet, politikken og albuerne, der ellers er så meget af i mange organisationer, ville de ikke have med at gøre. Det måtte vi selv finde ud af. Så længe vi tjener penge, får vi lov at være i fred,« siger direktøren, der simpelthen klappede, da han havde fået oplægget og fattet, at det var alvorligt ment. Peter Hinrup skynder sig at tilføje, at friheden ikke må forveksles med mangel på interesse fra succesvirksomheden, der siden 1993 er gået fra 1,5 mia. kr. i omsætning til over 100 mia. kr. i fjor.” (Evert 2001, p.11)

The article further explains that the reason why the impact of Flextronics’ practices etc. in Pandrup is relatively small could be because the factory is small in Flextronics’ terms:

"The explanation for the Americans 'mild' campaign in Pandrup may be that the company here is somewhat smaller than most of Flextronics' other companies, which in large numbers are located in low-wage countries such as Mexico, Brazil, Hungary, The Czech Republic, Poland and China, and are built around different micro-electronic specialties. The special feature of Flextronics is namely that it is not just an overgrown subcontractor that mass produces in quantities that makes 33 million mobile phones for Siemens over five years seem like a drop in the ocean "

“Forklaringen på amerikanernes milde fremfærd i Pandrup kan være, at virksomheden her er noget mindre end de fleste af Flextronics øvrige virksomheder, der i stort tal ligger i lavtlønsområder som f.eks. Mexico, Brasilien, Ungarn, Tjekkiet, Polen og Kina, og at de er bygget op omkring forskellige mikro-elektroniske specialer. Det helt specielle ved Flextronics er nemlig, at det ikke blot er en forvokset underleverandørvirksomhed, der masseproducerer i mængder, der får 33 mio. telefoner til Siemens over fem år til at se ud af nul og nix” (Evert 2001, p.11)

According to the article Flextronics in Pandrup is rather small. Furthermore, other Flextronics factories often are located in cheap-wage areas, with suppliers of plastic etc. located around them. Flextronics are also building new factories in these areas, and Ingeniøren reports the 16th of Marts that Flextronics has build eight new factories south of Gdansk within two years (Ingeniøren 2001).

Jyllands-Posten brings a review the 22nd of Marts of what they call a phone as Danish as it gets, the Siemens S40. The development on this phone was started by Bosch Telecom and finished by Siemens in Denmark, and it has been produced by Flextronics in Pandrup:

"(Two stars out of six) Since Siemens a year ago took over Bosch's telecommunications activities it meant among other things, that they took over a project which Bosch Pandrup had with the development of a new advanced mobile phone. Siemens continued the development and has had the result, Siemens S40, produced at Flextronics in Pandrup. So the new Siemens S40 could hardly be more Danish. However, either Siemens has not put its heart and the necessary resources into completing the development of the S40 or it has been launched too early. Regardless: it appears half finished, particularly on the software side. And the actual controls and the operating system of the phone are even less user-friendly than the Motorola phones, which we would not have thought possible. In other words, the S40 does not live up to the usual Siemens standard, when mobile phones are concerned"

“(to stjerner ud af seks) Da Siemens for et år siden overtog Boschs teleaktiviteter betød det bl.a., at man overtog et projekt, Bosch i Pandrup havde med udviklingen af en ny avanceret

mobiltelefon. Siemens fortsatte udviklingen og har ladet resultatet, Siemens S40 producere hos Flextronics i Pandrup. Så mere dansk kan den nye Siemens S40 næppe blive. Men enten har Siemens ikke haft hjertet med og stillet de nødvendige ressourcer til rådighed til færdigudviklingen af S40, eller også er den sendt på markedet for tidligt. Uanset: Den virker især på softwaresiden kun halvfærdig. Og selve betjeningen og styresystemet på telefonen er endnu mindre brugervenlig end på Motorola-telefoner, hvilket vi hidtil ikke troede muligt. Med andre ord: S40 lever ikke op til den sædvanlige Siemens-standard, hvad mobiltelefoner angår." (Halskov 2001, p.8)

Then the downturn starts, and the 6th of April 2001 (Berlingske.dk 2001) has a heading: "Cold winds in Pandrup" (Kolde vinde i Pandrup). Flextronics in Pandrup is dismissing 474 workers, 1/3 of the workforce. The reason is, according to the article, partly the global economic situation, partly the cutbacks among large mobile companies. The chairman of the NorCOM association is, according to the article, not surprised that it is Flextronics who has been hit first and not other telecommunication companies in the region:

"Niels Chr Gjerrild is the chairman of NorCOM, which is an association of 23 IT companies in Northern Jutland that also has Flextronics as a member. He is very surprised to hear that Flextronics must fire every third employee. But Niels Chr Gjerrild is not surprised that it is Flextronics, and not the other IT companies in NorCom that has been affected.

»Production companies are first in line when the world market hits a slump and therefore they are being affected now," he says." (Berlingske.dk 6/4-2001)

"Niels Chr. Gjerrild er formand for NorCOM, der er en sammenslutning af 23 nordjyske IT-virksomheder, der også har Flextronic som medlem. Han bliver meget overrasket over at høre, at Flextronic må fyre hver tredje medarbejder. Men Niels Chr. Gjerrild er ikke overrasket over, at det er Flextronic, og ikke de andre IT-virksomheder i Norcom, der rammes.

»Produktionsvirksomhederne står forrest, når det går ned på verdensmarkedet, og derfor rammes de nu,« siger han." (Berlingske.dk 2001, no page number)

This news is reported in several other articles the same days and the following days, and the situation at Flextronics is serious according to (Skouboe 2001):

"Yesterday management at one of Denmark's IT icons, Flextronics, in Northern Jutland handed out 474 notices among the 1,300 employees. After several months of attempts the CEO of Flextronics, Peter Hinrup, are taking the consequences. "We got hit by the global market downturn and we got hit hard. It has been clear to me since Christmas that there would be setbacks, but I am still shocked at how serious it is," says Hinrup. The large customers, which include Ericsson and Siemens, have no need for so many cell phones now, so the expensive production machines have been running slower every day since Christmas. And now several of them will stop completely."

"I går delte ledelsen på et af Danmarks IT-ikoner, nordjyske Flextronic, 474 fyresedler ud blandt de 1.300 medarbejdere. Efter flere måneders tilløb, tager den adm. direktør for Flextronic, Peter Hinrup, konsekvensen. »Vi rammes af verdensmarkedets nedtur og vi rammes hårdt. Det har stået klart for mig siden jul at det ville gå tilbage, men alligevel er jeg rystet over, hvor alvorligt det er,« siger Hinrup. De store kunder, der tæller Ericsson og Siemens, har ikke brug for så mange mobiltelefoner nu, så de dyrt indkøbte produktionsmaskiner har kørt langsommere dag for dag siden jul. Og nu skal flere af dem stoppes helt." (Skouboe 2001, p.1)

Most of the people fired are according to the article unskilled workers organised in SiD and Kvindeligt Arbejderforbund, who have been paid by the hour. The article also reports that the leader of SiD in Pandrup is deeply shocked and feel misinformed by the management in Flex-

tronics. According to him the message from Flextronics in January 2001 was that they needed 300 new employees and now more than 400 has been fired.

In these days it is not stated explicitly whether the order for 33 million phones by Siemens has been cancelled, but it is stated that Flextronics in Pandrup is fighting for new orders, and that the company is also looking for possibilities to produce other types of electronics than mobile phones, because it is too dangerous to focus on one product (Svarrer 2001a).

Berlingske.dk reports the 26th of April that Flextronics worldwide has announced a new round of lay-offs the day before, and that 7.000 employees will be fired, but it is argued that Flextronics in Pandrup will not be influenced by this (Jensen 2001). Erhvervsbladet reports the 27th of April that the current crisis for Siemens can hit Flextronics. 2.600 people at Siemens factories in Germany will be fired as a result and Siemens top-CEO states that it will be necessary to adjust the cooperation with Flextronics to match the current market situation and the declining sales of mobile phones (Krog 2001).

Computerworld focuses on the issue of growth in the telecom industry in Northern Jutland, the 4th of May, in this article a positive voice is heard from the university, proclaiming that because the main part of the cluster is development companies the crisis will not hit them as hard (Troelstrup 2001b). We see here the beginning of a discourse in NorCOM in which a distinction is made between the development companies, articulated as the core of the cluster, and the production company Flextronics:

"The mobile industry is in crisis, but in the radio technology center in Northern Jutland they are hoping to avoid most of the downturn, because they have almost exclusively focused on the small less vulnerable developing businesses.

The country's perhaps most well-functioning cluster - a collection of businesses that complement each other in a subject area, exists in Northern Jutland. Here is a major part of the country's expertise in mobile, wireless and radio technologies grouped. Employment in radio technology in North Jutland is around 4,000, which is almost four times as large as in the country as a whole[understood as employment ration, not in absolute numbers.] These are areas where knowledge is highly sought after, and in recent years a number of international companies have opened departments in the area. But they are also areas that have recently hit a crisis. Giants in the mobile industry such as Ericsson, Motorola and Siemens have announced cuts that will cost thousands of jobs and the industry expects the job cuts will soon spread to the undergrowth of subcontractors -including those in Denmark. However, it is possible that the mobile setback does not hit Northern Jutland so hard. - We mainly have development companies here. They are in a different situation than production, which the large companies are currently in the process of outsourcing and customizing. However, developments are probably the last that will be cut and outsourced, and should development be outsourced, it can become an advantage for the local development companies, says associated professor Gert Villumsen from the Department of Business Studies at Aalborg University. - Overall, I have no doubt that we will see continued growth in this area, however, with reservation related to any delays development of the next generation of mobile phone technology and Bluetooth, he says."

"Mobilbranchen er i krise, men i radioteknologi-centret i Nordjylland håber de at kunne undgå det meste af tilbageslaget, fordi de stort set udelukkende har satset på de mindre sårbare udviklingsvirksomheder.

Landets måske mest velfungerende cluster - en samling af virksomheder, der supplerer hinanden inden for et fagområde, findes i Nordjylland. Her er en god del af landets samlede ekspertise inden for mobile, trådløse og radioteknologier samlet. Beskæftigelsen inden for ra-

dioteknologi i Nordjylland er omkring 4.000 og dermed næsten fire gange så stor som i landet som helhed. Det er områder, hvor viden er stærkt efterspurgt, og det har de seneste år fået en række internationale virksomheder til at åbne afdelinger i området. Men det er også områder, der netop er kommet i krise. Giganter i mobilbranchen som Ericsson, Motorola og Siemens har meddelt nedskæringer, der vil koste tusindvis af job, og branchen forventer, at fyringerne snart vil brede sig i underskoven af underleverandører - også i Danmark. Det er dog muligt, at det mobile tilbageslag ikke kommer til at ramme Nordjylland så hårdt. - Vi har overvejende udviklingsselskaber heroppe. De er i en anden situation end produktionen, som de store selskaber i øjeblikket er i færd med at outsource og tilpasse. Derimod er udvikling sandsynligvis noget af det sidste, der bliver beskåret og lagt ud, og skulle udviklingsopgaver blive udliciteret, kan det blive en fordel for områdets udviklingsvirksomheder, siger lektor Gert Villumsen fra afdelingen for erhvervsstudier ved Aalborg Universitet. - Totalt set er jeg ikke i tvivl om, at vi vil se en fortsat vækst på dette område, dog med forbehold for eventuelle udskydninger af næste generation af mobiltelefoni og af Bluetooth, fortsætter han." (Troelstrup 2001b, p.11)

This distinction between Flextronics, which is officially part of the NorCOM association but articulated as being something different from the other companies the cluster, is made possible by a certain discourse. This discourse has been constructed around DC Development and the NorCOM association and it puts technology and R&D at the core of the cluster. It is a high-tech R&D cluster. Not a production cluster. Flextronics is part of the cluster, but not in the same league as the other companies as argued in the quote above. The R&D companies will be the last to get hit, whereas Production is on the frontline.

So from the NorCOM association, through the voice of the Chairmen, it has been articulated that it is no surprise that Flextronics is hit first. And this has been rearticulated here, by a voice from the university, and it has been added to the discourse that R&D companies in the cluster, which form the core of the "The country's perhaps most well-functioning cluster" (Landets måske mest velfungerende cluster), are in another boat than Flextronics, and that these R&D companies will without a doubt pull through the crisis.

And as the crisis continues, Flextronics in Pandrup succeeds in refocusing on other products. Fagbladet thus reports the 29th of June that Flextronics is hiring people again, and that 150 has been employed so far, due to the company receiving an order from Kiss Technologies which is producing equipment for satellite TV and DVD players (Fagbladet 2001). This progress continues, and Jyllands-Posten reports the 8th of August that the contract with Kiss Technologies resulted in the employment of 250 people, and that a further 200 has been employed because the production of mobile phones for Siemens is getting underway (Svarrer 2001b). Jyllands-Posten reports the 27th that although Flextronics has had a deficit internationally, and reduced the workforce with 10.000, it will not hit the factory in Pandrup which is now employing around 1.300 employees, who are now working on producing mobile phones for the upcoming Christmas sales (Svith 2001).

The factory in Pandrup is doing well, and that is according to Ritzaus Bureau the 8th of November also why Anders Fogh Rasmussen visits the factory as part of his election campaign in the fall of 2001:

"The US-owned mobile phone company Flextronics 20 km west of Aalborg. Here is Anders Fogh Rasmussen, dressed in a work jacket is mostly in dialogue with senior manager Jens Christian Clausen. The Senior Manager managed to on a rapid tour of the factory to tell that the 1300 employees can produce up to one million mobile phones a month when everything is going well for the company. And it goes well for Flextronics, which in the spring after having fired every third employed as a result of the international recession, is now almost back

to full capacity again. This is probably also why Fogh's campaign bus is passing by. According to the Liberal leader the company is a very good example of a positive development in Northern Jutland's economy, where foreign investment has paved the way for new Danish jobs in communication technology, an industry with a future. And there is even time for a little chat with a few of the factory's female employees, who are a little perplexed over the attention from the country's possible future prime minister, however, they manage to explain a bit about circuit boards, chips and how to attach displays to the phones. An even faster chat happens when Fogh Rasmussen struggling against his schedule rushes through the cafeteria, where a group of female employees are having packed lunches and biksemd for lunch. "It's a nice hearty lunch," says Rasmussen, adding: have a nice day. And as with a single mouth the eight women reply, "You too" after the politician passing through. At the entrance Fogh Rasmussen says goodbye to senior manager, who hesitantly says "Yes, it was indeed very fast." Anders Fogh is thanking him for the visit. "It looks good," he assures the senior manager, before he slips back into the bus."

"Den amerikanskejede mobiltelfonvirksomhed Flextronics 20 km vest for Aalborg. Her kommer Anders Fogh Rasmussen iklædt arbejdsjakke mest i dialog med seniormanager Jens Christian Clausen. Seniormanageren når på en hastig rundtur rundt på fabrikken bl.a. at fortælle, at de 1300 ansatte kan producere op til en million mobiltelefoner om måneden, når det går rigtigt godt for virksomheden. Og det gør det for Flextronics, der efter i foråret at have fyret hver tredje ansat som følge af international afmatning nu stort set er oppe på fuld kraft igen. Det er formentlig også derfor, at Foghs kampagnebus lægger vejen forbi. Ifølge Venstres formand er virksomheden nemlig et rigtigt godt eksempel på en positive udvikling i det nordjyske erhvervsliv, hvor udenlandske investeringer har banet vej for nye danske jobs indenfor kommunikationsteknologi, en branche med fremtid i. Og lidt dialog bliver det da også til på fabrikken med et par af de kvindelige ansatte, der lidt befippede over opmærksomheden fra landets mulige næste statsminister får forklaret lidt om printplader, chips og påsætning af displays på telefoner. Endnu hurtigere dialog er der tale om, da Fogh Rasmussen i kamp med tidsplanen haster ud gennem kantinen, hvor en gruppe kvindelige ansatte spiser madpakker og biksemd til frokost. "Det er en dejlig solid frokost", siger Fogh Rasmussen og fortsætter: Hav det godt. Som med en mund svarer de otte kvinder "I lige måde" efter politikerens på gennemrejse. Ved indgangsdøren tager Fogh Rasmussen afsked med seniormanageren, der lidt tøvende siger "Ja, det blev jo meget hurtigt". Men Anders Fogh takker for besøget. "Det ser godt ud", forsikrer han seniormanageren, inden han atter smutter ind i bussen." (Andersen 2001, no page numbers)

Berlingske Tidende also reports on the visit the 11th of November, and here it is compared with a royal visit, and a picture of Anders Fogh Rasmussen as the majesty is painted (Kassebeer 2001). It is further argued that Anders Fogh Rasmussen will work to ensure that the periphery in Denmark, such as Pandrup, also receives investments, attention and infrastructure. Flextronics also forms the venue for a discussion in the election campaign between Bendt Bendtsen from the Conservative Party and Marianne Jelved from the Social-Liberal party, as reported in Jyllands-Posten the 17th of November (Gram 2001).

These visits add to the discourse in which the development of Flextronics in Pandrup is linked to the issue of economic development in Northern Jutland. This discourse forms a functional relationship with the discourses emerging in relation to the NorCOM association and the R&D companies in this. We saw before how Flextronics is articulated in a particular way from the NorCOM association and the university, which makes it different from the R&D companies in the NorCOM cluster. These articles dealing with the visits supports this view, by pulling Flextronics into a regional development discourse where it become a barometer for the state of development in Northern Jutland. We saw earlier how, through the Dancall and Dancall Telecom days a relationship was formed between the well-being of Pandrup municipality and the factory. With these articles this link is rearticulated and focus is expanded; now the factory's situation is being linked directly to the state of development in Northern Jutland. The factory becomes an example

of success in peripheral Denmark, more than a part of a telecom cluster. A gulf is thus forming discursively between Flextronics and the R&D companies within the cluster.

And this gulf is what makes it possible in the future to dismiss the entire discourse about business problems at Dancall, Dancall Telecom, Bosch and Flextronics, as something which has nothing to do with the NorCOM cluster and its core of R&D companies, which according to another discourse is driven by technology. And the prevalence of this discourse is what makes the engineers, most of whom are educated at AAU, accept as truth that technology and not other competences are their job, and thus becomes what drives TIDK into the situation we saw. And the same happens to other companies, for example Digianswer, as I will also return to.

Nordjyske.dk announces the 20th of December that Flextronics has fired 239 temporary employees, which leaves the company in Pandrup with a staff of 900 (Nordjyske.dk 2001b). Berlingske Tidende reports the 27th of April 2002, that Flextronics in Pandrup avoids lay-offs, despite Siemens conducting another round of mass lay-offs (Skouboe 2002a). And the company has also gained other customers, as reported in Ingeniøren the 24th of May:

"The international contract manufacturer Flextronics has factories all over the world. Yet the Korean company Digit All World specifically asked to produce its new set-up box at Flextronics' large Danish branch in Pandrup. It's not every day that a company from the Fareast places their production in wage-intensive Denmark. On the contrary, Danish companies most often subcontract their production to sub-contractors in low-wage countries in the Fareast. Nevertheless, the Korean company Digit All World chose to produce its new set-up box T9300 for the European digital television system DVB-MHP at the Flextronics plant in Pandrup, Denmark, although contract manufacturer Flextronics has electronics factories worldwide.

We were obviously very proud of the order, but it is not just because the Danes have a reputation for being skilled and flexible, says sales and marketing manager Jesper Knudsen from Flextronics"

"Den internationale kontraktproducent Flextronics har fabrikker over hele verden. Alligevel bad den koreanske virksomhed Digit All World specifikt om at få produceret sin nye settop-boks i Flextronics' danske afdeling i Pandrup. Det er ikke hver dag, at fjernøstlige virksomheder henlægger deres produktion til det løntunge Danmark. Tværtimod lægger danske virksomheder ofte deres produktion ud til underleverandører i lavtlønsområder som netop Fjernøsten. Alligevel valgte den koreanske virksomhed Digit All World at få produceret sin nye settop-boks T9300 til det europæiske digital-tv system DVB-MHP på Flextronics' danske fabrik i Pandrup, selv om kontraktproducenten Flextronics har elektronikfabrikker over hele verden.

Vi blev naturligvis meget stolte af ordren, men den skyldes ikke kun, at danskere har ry for at være dygtige og fleksible, siger salgs- og marketingchef Jesper Knudsen fra Flextronics" (Dreijer 2002)

Several articles the following months reports that Flextronics in Pandrup is hiring people again. And Berlingske Tidende reports the 16th of August that although Flextronics are laying off 5.261 workers worldwide, the factory in Pandrup will avoid lay-offs, despite a deficit of 106,9 million DKK the previous year (Crone 2001). The article further reports that the strategy of Flextronics is to close production in high-wage areas, but this will not affect the factory in Pandrup in the near future, according to the CEO of the factory.

Berlingske Tidende reports the 18th of December, that due to an order from Kiss technology Flextronics in Pandrup is saved, and is now doing well, and have employed 700 new workers

(Skouboe 2002b) The same news is reported in several articles in December, and the number of employees is now close to 1.700 people according to (Erhvervsbladet 2002). Approximately three months later the message changes again, now the heading is "Flextronics is gearing down" (Flextronics gearer ned) in Jyllands-Posten the 26th of February 2003, and the reason is that Siemens has reduced its orders, and the production of phones has plummeted from around 1 million every month to around 650.000 (Stenvei 2003b).

Jyllands-Posten reports the 26th of May that Flextronics has expanded focus from mobile phones to products such as DVD players and hearing aids (Stenvei 2003a). The article reports that the contract with Siemens for 33 million phones, which is the lifeblood of the company, expires the following year, and that the CEO of Flextronics in Pandrup does not believe that a huge new contract will follow. This is also due to competition from one of Flextronics factories in Hungary, which is larger and where the workers are cheaper.

Ritzaus Bureau reports the 26th of July that Flextronics is firing 500 workers, 1/3 of its staff, because of the low sales of mobile phones from Siemens which has resulted in Siemens not ordering as many phones as agreed upon (Ritzaus Bureau 2003a). Another article from Ritzaus Bureau the same day elaborates on the reason:

"Siemens' demands for a more competitive price from Flextronics have already caused the relocation of two of the four production lines to Eastern Europe where wages are lower. According to the factory's management they may not be the last. Flextronics has long had to live with large employment fluctuations. Also in the spring of 2001 the mobile phone plant made nearly 500 employees redundant because the sale of mobile phones had stalled."

"Kravene til Flextronics fra Siemens om større konkurrencedygtighed på prisen har allerede betydet en udflytning af to af fire produktionslinjer til Østeuropa, hvor lønnen er lavere. Det bliver muligvis ifølge fabrikkens ledelse ikke de sidste. Flextronics har længe måttet leve med store beskæftigelsesmæssige op- og nedture. Også i foråret 2001 afskedigede mobiltelefonfabrikken knap 500 medarbejdere, fordi salget af mobiltelefoner var gået i stå." (Ritzaus Bureau 2003b, no page number)

A number of articles dealing with the lay-offs follows, and one month later, the 26th of August, Jyllands-Posten announces that a new round of lay-offs is underway, this time 54 full-time permanent employees, and the same article reports that the management in the company does not believe the crisis to be temporarily this time (Stenvei 2003c).

This is further supported by an article in Jyllands-Posten the 2nd of September in which it is argued that Siemens is now selling phones again, but this has not led to new orders to Flextronics in Pandrup. The crisis in Flextronics in Pandrup is therefore not caused by declining sales in Siemens, but by Flextronics in Pandrup being unable to compete with other factories in low-wage areas (Stenvei 2003d). Computerworld Top 100 brings an article the 3rd of November, which reports that Flextronics in Pandrup is now moving into production for the market for medical technology to gain a new line of products (Andersen 2003b). Another article the same day in Computerworld Top 100 reports that Flextronics in Pandrup has turned the previous year's deficit to a surplus in 2003 of 123 million DKK (Andersen 2003a).

However, already the 15th of January 2004, Mediawatch.dk announces that Flextronics in Pandrup is firing 700 of the 1000 employees in the company (Mediawatch.dk 2004). (Berlingske.dk 2004a) elaborates upon the story the same day. The message is that due to having lost an order to Siemens, the company is now facing another change of owner and it is contemplated whether it will be a management buyout. This message is repeated in 18 articles in different media countrywide that day. The closure also causes concerns in the county:

"The dismissal of 500-700 employees at the Flextronics plant in Pandrup represents so far a sad culmination of a trend where Northern Jutland has repeatedly lost industrial jobs in competition with low wage countries in Asia and Eastern Europe. But Mayor Orla Hav fears that this is more than a transient phenomenon, writes NORDJYSKE Stiftstidende. – If it was only the business cycle, which means that we lose jobs in production, but then there's an increase again. But if we are hit by companies moving jobs abroad permanently, then it is a disaster, says the county mayor. Futurist Anne Skare Nielsen confirms those fears with this brutal comment: - If you are looking for a permanent job as an unskilled laborer in an industrial workplace, then you should be ready to move to Eastern Europe. That is where the jobs are going to be and not in Denmark, says Anne Skare Nielsen, co-owner of consulting firm Fahrenheit 212."

"Fyringen af 500-700 ansatte på Flextronics-fabrikken i Pandrup udgør indtil videre et trist højdepunkt i en udvikling, hvor Nordjylland igen og igen har mistet industrijob i konkurrence med lavtlønsområder i Asien og Østeuropa. Men amtsborgmester Orla Hav frygter, at der er tale om mere end et forbigående fænomen, skriver NORDJYSKE Stiftstidende. - Hvis blot det er konjunkturerne, som gør, at vi mister de mange arbejdspladser i produktionen, så kommer der jo fremgang igen. Men hvis vi også er ramt af, at virksomhederne flytter arbejdspladser permanent til udlandet, så er det en katastrofe, siger amtsborgmesteren. Fremtidsforskeren Anne Skare Nielsen bekræfter de bange anelser med denne barske salut:- Hvis man leder efter et fast job som ufaglært på en industriarbejdsplads, så skal man være klar til flytte til Østeuropa. For det er dér og ikke i Danmark, de arbejdspladser kommer til at være, siger Anne Skare Nielsen, der er medejer af rådgivningsfirmaet Fahrenheit 212." (Ritzaus Bureau 2004a, no page number)

There is however also more positive views of the situation, and the message from the CEO of RTX Telecom is that the factory may have a future in producing electronics with lower production numbers than mobile phones (Ritzaus Bureau 2004a). The link between the industry situation in Northern Jutland and the state of Dancall is rearticulated again in (Ritzaus Bureau 2004b) the same day, in which it is also argued that the lay-offs marks a new low, in the process of Northern Jutland losing industry jobs to low-wage areas in Asia and Eastern Europe.

The flood of articles dealing with the lay-offs continues the following day, the 16th of January, where the news is reported in no less than 31 articles in different media, with headings such as "Serious fears of a crisis in Northern Jutland" (Alvorlig frygt for nordjysk krise) (Vejle Amt Folkeblad 2011), Flextronics will change owner again" (Flextronics skal igen skifte ejer) (Wichmann 2004a), "Siemens moves production to low-wage countries" (Siemens flytter produktionen til lavtlønslande) (Wichmann 2004b) and "Lay-offs: a black day in Pandrup" (Fyringer: Sort dag i Pandrup) (Brahm 2004). The message which is repeated is that 700 will be fired, that Pandrup is in shock and that the management of the company is considering a management buyout. The following day the job situation in Pandrup hits the media again, and it is reported that ministers are ready to help the city:

"On Monday, two members of the government - Employment Minister Claus Hjort Frederiksen (V) and Science Minister Helge Sander (V) are heading for Pandrup and Flextronics to discuss the situation with the factory's management and employees and the mayor of Pandrup, among others.

What the two ministers can do concretely for Flextronics og Pandrup in the current situation is unclear, but Claus Hjort Frederiksen said to TV 2/Nyhederne that it is certainly not money that will be lacking in the AF's [the job centre] efforts.

"På mandag sætter to af regeringsmedlemmerne - beskæftigelsesminister Claus Hjort Frederiksen (V) og videnskabsminister Helge Sander (V) kursen mod Pandrup og Flextronics for at diskutere situationen med bl.a. fabrikkens ledelse og ansatte og Pandrups borgmester.

Hvad de to ministre konkret kan gøre for Flextronics og Pandrup i den aktuelle situation, er uklart, men Claus Hjort Frederiksen har til TV 2/Nyhederne sagt, at det i hvert fald ikke er penge, der skal mangle i AF's indsats." (Løcke 2004)

The flood of articles continues the following days also, and one initiative resulting from the focus on unemployment, is the creation of a fund, a so-called future fund by the Danish government, with 16 billion DKK. The money is ear-marked for the creation of new jobs in IT, Bio-tech and nanotechnology. And this has already caught the attention of politicians in Northern Jutland, as explain in an article in Jyllands-Posten the 19th of January:

"The fund aims to strengthening the development of new jobs in IT, biotech and nanotechnology, and since Northern Jutland County in particular has had a strong partnership with the research environment at Aalborg University and many high-tech companies, more local politicians are already wooing the fund, even if it has not yet been created. "This is a fantastic initiative and it is just what it takes to ensure that Denmark and Northern Jutland get new strong knowledge-intensive businesses, while we may have to say goodbye to some of the jobs in manufacturing in the next couple of years. This is due diligence," says CEO Hans Jørgen Dalum from the Liberal Party's industrial policy committee to TV 2 Nord."

"Fonden skal blandt andet styrke udviklingen af nye arbejdspladser inden for IT, biotek og nanoteknologi, og da Nordjyllands Amt især har haft et stærkt makkerskab mellem forskningsmiljøet på Ålborg Universitet og mange højteknologi-virksomheder, bejler flere lokale politikere allerede til fonden, selv om den endnu ikke er oprettet. »Det er et fantastisk flot initiativ og det er lige, hvad der skal til for at sikre Danmark og Nordjylland nye stærke videnerhverv, samtidig med at vi over nogle år måske må sige farvel til nogle af arbejdspladserne i fremstillingsindustrien. Det er rettidig omhu,« siger direktør Hans Jørgen Dalum fra Venstres erhvervspolitiske udvalg til TV 2 Nord" (Svaneborg 2004, p.3)

It is important to note, that the funding is aimed at IT, Bio-tech and Nanotechnology, and not at telecommunications. This was according to the chairman in the NorCOM association, at that time, due to the fact that in the minds of the politicians, the telecommunication cluster was dead with the demise of Dancall and Flextronics. Therefore they wanted to create jobs in other industries. Consequently, it was difficult for people in NorCOM to promote a business focus in the NorCOM cluster at the time, because the political sphere saw the cluster as dead, although it was a time where many R&D companies existed in the cluster and there was a technological potential which could have been used:

"Where it was not very well accepted or well supported, that was especially from the political side, because at that time people just said, well now Dancall is gone [People often referred to Flextronics as Dancall; that is also what is done here], so now the entire bubble is over. But that was when we had all the competencies and said that now we need to get something out of it."

"Der hvor det ikke blev ret godt accepteret og ret godt understøttet, det var specielt fra politisk side, fordi på det tidspunkt havde man jo sagt, jamen nu er Dancall væk [NOTE: People often referred to Flextronics as Dancall, which is also what is done here], så nu hele den bobbel, den er ovre. Men det var jo der vi stod med alle kompetencerne og sagde at nu skulle vi altså have noget ud af det." (Buus 2010)

The following weeks brings a number of articles about the outsourcing of industry jobs to low-wage regions, mass lay-offs among Danish companies and what can be done to help the people fired. As such the lay-offs at Flextronics become part of another discourse, the discourse in the

media about employment, and not the discourse about the high-technology telecommunication cluster NorCOM.

The crisis in Flextronics continues, and is mentioned in a number of articles, but in the end the idea of a management buyout does not work, and in the beginning of June 2004, it is announced by several media, for example (Ugebrevet A4 2005), that Flextronics is closing down the factory, and the last 300 employees will be fired.

As I will show shortly, this discourse around the cluster had around 2004 developed into a state where technology and engineering knowledge are constructed as the basis, the core, of the cluster. Business is not the core. One can say that at this time the gulf between Flextronics and the NorCOM cluster is complete. The financial troubles which had haunted Dancall, Dancall Telecom and Bosch Telecom over the years are turned into a discussion about jobs for unskilled workers and the need to retrain workers. This also means that the fact that Dancall, Dancall Telecom and Bosch Telecom did rather badly from a marketing perspective, missing the market demands time and time again and being inefficient in its organisation is not articulated in the discourse surrounding the R&D companies in the NorCOM association.

The discursive gulf between the NorCOM association and the high-tech R&D companies on one hand and Flextronics, production, and deficits on the other, means that when Siemens acquired the R&D department in Bosch Telecom, and moved this to Nørresundby, this R&D organization becomes part of the high-tech technology cluster described in the discourses around the NorCOM organisation. And thereby it becomes detached from the discussion about the production company Bosch Telecom, which fared badly in relation to spotting markets and making a surplus, a discourse, which as this section has shown, ended in a national discussion about high and low skilled jobs in Denmark and economic development in peripheral areas.

This is why it was possible for a discourse dealing with the technology core of the NorCOM cluster to emerge, in which the business side of the companies was disregarded. The discourse was that technology was the core, because as long as the engineers possessed knowledge then they would be acquired by changing MNCs, coming and going in the region, and as such there was no rationale for the engineers in the cluster to focus on business, organizational or marketing issues.

Having now presented the discourses around DC Development and Dancall it is now time to look in detail at the dynamics characterising the NorCOM cluster in the 2000s, and thus the last part of its history.

8.7 NorCOM in the 2000s

From when the NorCOM association was first mentioned in the media, to the early 2000, when the cluster, along with the rest of the world, experienced the burst of the bubble, the statements about the state of the cluster went from a notion of success, to a notion of an industrial fairytale. Erhvervsbladet reports in an article the 28th of February 2002, (Carstensen 2000a) about the background for what is called the "The Mobile Phone Fairytale" (mobiltelefoneventyr). In the use of the word "mobile fairytale", we see a re-articulation of the success statement, and a sharpening of this; now the cluster is not just a success story, now the cluster has reached a level of success where it is comparable to a fairytale. And so the article starts:

"Every week a new mobile phone company in Northern Jutland. An exaggeration? -Certainly. But Northern Jutland has nevertheless delivered the closest thing in Denmark to Silicon Val-

ley in California in terms of the concentration of a particular type of high-tech companies. In short, Northern Jutland has all of the mobile phone expertise in Denmark.”

“Hver uge sin nye mobiltelefonvirksomhed i Nordjylland. En overdrivelse? – Javist. Men Nordjylland har alligevel præsteret noget af det tætteste, man i Danmark kommer Silicon Valley i Californien, hvad angår koncentrationen af en bestemt type højteknologiske virksomheder. Nordjylland sidder kort og godt på mobiltelefonekspertisen i Danmark.” (Carstensen 2000a, no page number)

The association has now grown to 25 members, and one person is put at the centre of the story of NorCOM, Jørgen Bach Andersen, due to his role as leader of CPK at AAU. In a fairytale style the article explains:

“But just like in the real world of fairy tales an Andersen has been of immense importance for the development. In Northern Jutland H. C., however, has been replaced by a J.B. Professor Jørgen Bach Andersen, the managing director of the Center for Personal Communication, CPK, at Aalborg University, is attributed an extremely large role in the fairy tale, if you ask the people who also influenced the development. He comes to light as the man who, before everyone else, saw the enormous potential that were and still is in mobile communication. First and foremost he is praised for his perseverance and his clear goals”

“Men akkurat som i de rigtige eventyrs verden har en Andersen haft umådelig stor betydning for udviklingen. I Nordjylland skal H.C. imidlertid udskiftes med et J.B. Professor Jørgen Bach Andersen, der er daglig leder af Center for PersonKommunkation, CPK, ved Aalborg Universitet, tilskrives en endog meget stor rolle i eventyret, hvis man spørger flere af dem, der i øvrigt har været med til at præge udviklingen. Han fremdrages som manden, der før alle andre så det enorme potentiale, der lå og ligger i mobil kommunikation. Frem for alt roses han for sin vedholdenhed og sit klare mål.” (Carstensen 2000a, no page number)

The question is, what then, was this clear goal, and the answer is “vild forskning” (wild research):

“CPK has a close relationship with most of the development companies, where many of the entrepreneurs are educated at the university. Numerous projects are aimed at business, but Jørgen Bach Andersen will never let go of the “wild research”. - We must never succumb to just being a development department for the companies, then we lose our *raison d’être*. We also need to carry out fundamental research. After all, that is where we occasionally get the greatest achievements, even if the companies cannot see it right now, he adds”

“CPK har et tæt samarbejde med de fleste udviklingsvirksomheder, hvor mange af iværksætterne er uddannet på universitetet. En lang række projekter er virksomhedsrettede, men Jørgen Bach Andersen vil aldrig give slip på den “vilde forskning”. – Vi må aldrig forfalde til at blive en udviklingsafdeling for virksomhederne, for så mister vi vores eksistensberettigelse. Vi er nødt til også at drive grundforskning. Det er trors alt også herfra, at vi ind imellem henter de nyeste og vigtigste landvindinger, selv om virksomheder måske ikke lige i nu’et kan se det, tilføjer han” (Carstensen 2000a, no page number)

The statement made here is, that technology, and specifically basic research is the reason why NorCOM is successful. It is not because of business competences, such as management practices or organizational practices. On the contrary, it is stated explicitly, that some of the newest and most important things are achieved through basic research, research that companies cannot see the value of at the time it is conducted. The article ends with a view to the future, and here it is stated, not that other types of competences also should be developed in the region, as we saw was the point made by (Gelsing & Brændegaard 1990), but simply that even more emphasis should be put on research and development in the technological field, where Jørgen Bach Andersen is located.

"Today he [Jørgen Bach Andersen] assesses that Northern Jutland has reached a self-perpetuating state where the development carries itself most of the way. New ideas emerge in many businesses and become new companies. Young talents from home and abroad no longer fear that they will get stuck in a deadend in Northern Jutland, because they can see there are plenty of job opportunities, if the fit is not great in the first company. But Northern Jutland is not a "perpetual motion machine". - We constantly have to be on our toes. Even if the development is self-reinforcing, it is not a given. We must continue to make an effort to be at the forefront in terms of research and development, says Jørgen Bach Andersen..."

"I dag vurderer han [Jørgen Bach Andersen], at Nordjylland har nået en selvforstærkende tilstand, hvor udviklingen et langt stykke hen af vejen bærer sig selv. Nye ideer opstår i mange virksomheder og bliver til nye virksomheder. Unge talenter fra ind- og udland frygter ikke længere at havne i en blindgyde i Nordjylland, fordi de kan se, der er masser af jobmuligheder, hvis ikke kemien passer det første sted. Men nogen "evighedsmaskine" er Nordjylland ikke. - Vi er konstant nødt til at være på tæerne. Det er udviklingen selvforstærkende, men den er ikke givet. Vi må også i fremtiden gøre en indsats for at være i førerfeltet, hvad angår forskning og udvikling, siger Jørgen Bach Andersen..." (Carstensen 2000a, no page number)

It is worth noting here that the emphasis is on the new "idea" which forms new companies. It is articulated, in this way, that a great new idea is enough to carry a company to success. Nothing is mentioned about the organizational competences, marketing competences, or management competences needed in successful ventures. It is thus a re-articulation of the statement we saw emerging in (Dalum 1993) and (Dalum 1995) but now the focus is more explicitly on technology competences. Let us therefore look a bit closer at the relationship between NorCOM and AAU over time.

8.7.1 The relationship between NorCOM and AAU

According to interviews the relationship forming between NorCOM companies and the university was symbiotic. The university could use the presence of the cluster in attracting funding for telecommunication research, making arguments about being located in a region, which were thriving within the industry and referring to the organisation, and in the case of the business department use the cluster as an empiric field for cluster research. On the other hand, the industry, and especially smaller companies, could utilize the presence of larger companies, and being part of the same club in their promotion and further, a strong university meant a supply of talented engineers which was the rationale for larger companies to support the NorCOM club and thus the university. This relationship between AAU and the industry became closer in 1998, where Center for PersonKommunikation (CPK) is moved from AAU's buildings next to NOVI and into NOVI buildings.

There is no doubt, when looking at the empirical sources, that the university have had an importance for the industry, and that the university has been good at sensing the needs of the industry both in relation to educational issues as well as research challenges:

"But the AAU [Aalborg University] has an incredible, plays a critical role as the facilitator between research and then the actual implementation by the companies. Because AAU is very good at making the research applicable; and also very good at understanding what is needed in practical terms and then do research in those areas. So they are good at both things."

"Jamen AAU har jo en utrolig, spiller jo en utrolig vigtig rolle som brobygger, imellem forskningen og så sådan faktisk implementering ude i virksomhederne. Fordi AAU er rigtigt dygtige til at få den forskning gjort praktisk, og også rigtigt dygtige til at forstå hvad er der brug for ude rent praktisk og så få forsket indenfor de områder. Altså man er dygtige til begge veje." (Gjerrild 2010)

Despite this symbiotic co-existence, AAU has always, according to interviews of a high-level person at the university as well as people in the industry had a complex relationship to the NorCOM organization. On one hand it has been the clear policy of AAU to support initiatives, which could improve the technological skills in the region, and this has always been a characteristic of NorCOM, given the focus on knowledge sharing, attracting skilled workers and promoting the region. The relationship between AAU and the telecommunication industry has as such been symbiotic, the presence of the industry has helped AAU in promotion issues and made it easier for the university to attract high-class researchers in the telecommunications field, and further, cooperation with large MNCs in the cluster in research projects has made it easier for the university to attract research funding. Seen from the industry the university has presented for the companies in the region a source of talented engineers, and given the nearness between university and industry, and close cooperation, the companies have been able to influence then educations so that the engineers coming out from the university possessed exactly the competences the industry wanted. So the symbiotic relationship between AAU and the companies in the cluster can as such be understood as a win situation for both sides.

What nevertheless made the relationship difficult, and in a sense what can be termed a love-hate relationship as seen from certain levels at AAU, was the fact that the success of telecommunications, and the focus on the NorCOM cluster in media, meant that other departments and scientific fields were being overlooked. The computer science department, for example, had the same high class internationally in the late 1990's according to one of the high-level persons within AAU, but because of the focus on the telecommunication this fact didn't come out in the media, and the focus on NorCOM meant that it was difficult to support the high-class software environment. And therefore some in high-level circles at the university tried to gain a broader focus than telecommunications in the phase leading up to the formalization of NorCOM in 2000. They would have liked NorCOM to open up towards the IT industry, and to be located at AAU in the network centre, which is a special department aimed at creating and supporting business networks, because then the organization could have thrived on the networking competences already existing at AAU, and the promotion of the NorCOM association could have been coordinated with other initiatives at AAU to thereby avoid a situation in which the telecommunication would overshadow other departments and competences at the university.

Amongst the companies who were members of NorCOM this approach from the university was seen in another way. One of the people, who were chairman for the organization for a period, argued in an interview, that the wish amongst members of NorCOM that it should remain a pure private telecommunications organisation located outside public institutions arose because people in the municipally and county wanted the NorCOM organization to have a public run secretariat, which in turn meant that the members were to pay the municipality, county or university for this, depending on where exactly it should be located, and hence fund public secretarial workplaces. And the members did not want to fund such workplaces, because they believed that they could make a more efficient private organization. They saw the approach from the governmental sphere as a strategy to make jobs more than a strategy to support the organization. Niels Bus elaborated upon this paradox:

"Yes, there was a paradox in that. Because through this office Niels Maarbjerg is the head of which was the instigator of a number of initiatives trying to get the industry involved and they had some good resources to help create organizations which, incidentally, I think the university should, but the university was a strong player around Mindworks, and it was backed by the Region also, which was in competition with NorCOM. IKT Forum was the university too, as they were the ones who supplied funds to the Secretariat and to create initiatives that are in some way could be run from the university. And mostly on a competency base, and back then we sat around, at least some of us, and tried to think, well, it should not

be on competence related basis, it should be on a commercial basis, it must be from the viewpoint of the companies. Of course it should be in collaboration with the university, so there was a paradox. But there were also in NorCOM an agreement that somebody from the university should be appointed to NorCOM, so there was an element of conflict there, some people from the university were on the one side, and Bent [Dalum], he was definitely on NorCOM's side, in this context. It was always a puzzle to get the right people appointed to NorCOM's from the university, so that there was no overlap between the two organizations. There was, it was a bit annoying in many ways, right."

"Ja, der var et paradoks i det der. Fordi igennem det kontor Niels Mårbjerg han er chef for, der var man jo initiativ tager til en række initiativer som forsøgte at få industrien ind og man havde nogle gode midler til ligesom at kunne være med til at lave organisationer, som jeg i øvrigt synes universitetet skal, men universitetet var en stærk spiller omkring Mindwork, og var bakket op af regionen også, som var i konkurrence med NorCOM. Også IKT forum var universitetet jo også på mange måder dem der leverede midlerne til, til sekretariat og til at tage nogle initiativer, som på en eller anden måde kunne køres fra universitetet. Og mest på kompetencemæssig basis, og dengang der sad vi, i hvert fald nogle af os, og prøvede at tænke på jamen det skal ikke være på kompetencemæssig basis, det skal være på forretningsmæssig basis, det skal være fra virksomhedernes synspunkt. Det skal selvfølgelig være i et samarbejde med universitetet, så der var et paradoks i. Men der var også i NorCOM en aftale om at der skulle udpeges en fra universitetet til at sidde i NorCOM, og, så der var sådan et halv stridselement i det der, hvor der var nogen på universitetet der var på den ene side, og Bent [Dalum] han var bestemt på NorCOM side, i den sammenhæng, det var jo altid et puslespil om at få de rigtige udpeget til NorCOMs bestyrelse fra universitetet, sådan at ikke der blev sammenblanding mellem de to organisationer. Der var, det var lidt trælst på mange måder, ikke." (Buus 2010)

Asked to the consequences of this he replied:

"Nothing, really, nothing, really, nothing more than we wasted some energy on it once in a while. I would say. But to some degree or another, I would say that in some ways it hurt the cooperation between the university and NorCOM. The university had fairly large sums to run that kind of thing, and if it was an industry organization that had been independent but cooperated with the university, then it would have been much easier to get companies to support the university rather than if it was a university-run initiative. There are some companies who do not want to join, because a lot of the time, the roles those firms have to play have been defined by the university before they join. Sometimes it may be good idea that the companies try to define some things and then connect with the university afterwards. It gets a better, well both parts should be there, but it gets a better balance in it. What you have heard are all the stories about companies that keep themselves at arm's length from the university because they are a little afraid to waste their time"

"Ikke rigtig nogen, ikke rigtig nogen, ikke andet end at vi spildte noget energi ind imellem på det. Det vil jeg sige. Men i en eller anden grad så vil jeg sige, at det i nogle sammenhænge gik ud over samarbejdet mellem universitetet og NorCOM, universitetet havde rimeligt store midler til at køre den slags ting, og hvis det var en industri organisation som var uafhængig som var med til at samarbejde med universitetet, så ville det have været meget nemmere at få virksomheder til at støtte op omkring universitetet frem for hvis det er nogle universitetets drevne initiativer. Der er nogle virksomheder der står af på det, fordi mange gange så er rollerne de virksomheder skal have defineret af universitetet før de kommer på. Nogle gange kan det være godt nok at virksomhederne forsøger at definerer nogle ting og så kobler universitetet på sig. Det får en bedre, altså begge dele skal være der, men det får en bedre balance i det der. Det, du har hørt alle de historier om virksomheder der holder sig lidt væk fra universitetet fordi de er lidt bange for at komme til at spille deres tid." (Buus 2010)

The issue of companies wasting time cooperating with AAU was however not a big issue, as Buus also explained:

“Well, some of those, what are they called, it is mostly some EU projects and other types of projects where the university has acquired some money, and they must have some companies involved to get the money released, etc. where some, and I do not think that is right, for there are some great projects to. We have been involved in some great projects, but there are some, where they are merely there to get the money released. And that is of no use to the companies, really. If it is not something they have already made up their mind that they need [the companies] then it is more of a burden. But it is not a big issue, I would say.”

“Jo, nogle af de der, hvad hedder de, det er mest sådan nogle EU projekter og andre typer projekter hvor universitetet har skaffet nogle penge, og så skal de have nogle virksomheder med for at de kan få pengene udløst osv., hvor at nogle, og det mener jeg ikke er rigtig, for der er også nogle rigtigt gode projekter, vi har været med i nogle rigtig gode projekter, men der er nogle hvor de lidt mere er, skal være med for at pengene kan blive frigjort. Og det nytter ikke rigtigt noget for virksomhederne. Så hvis ikke det er noget de har gjort op med sig selv de har et behov for, så er det mere sådan til belastning. Det er ikke et stort emne, det vil jeg sige.” (Buus 2010)

The outcome was that NorCOM became a purely private club with its own secretariat. One high-level person at AAU argued, that this proved to be a weakness, because this meant that the organization did not draw on the networking competences established at the university, and the fact that the private secretariat consisted mainly of one one-man consultancy company, which in turn caused a hostility to fundamental changes, for example in relation to openness between NorCOM and the IT environment with its own IT Forum association, because this company was relying heavily on supporting NorCOM.

The year 2000 was also the year in which the success of the NorCOM cluster was used as inspiration for another technological environment in the region; the medico environment.

8.7.2 NorCOM and the medico industry

Ingeniøren publishes an article the 14th of February which mentions NorCOM as a role model, worth copying, under the heading “Northern Jutland will invest in Medico-Electronics” (Nordjylland vil satses på medico-elektronik). The message is that plans have been made among electronics people in the region to repeat the success of mobile communication, but this time within the medico-industry. Actually, the word used is “fairytale”:

“Over the past few months, the electronics people in Northern Jutland have made great plans. They want to repeat Northern Jutland’s success in the mobile phone industry, but this time the adventure will take place in medical electronics.”

“Gennem de seneste måneder har elektronikfolk i det nordjyske lagt store planer. De vil gentage den nordjyske succes i mobiltelefon industrien, men denne gang skal eventyret foregå inden for den medicinske elektronik.” (Krøyer 2000c)

To reach this goal a secretariat has been formed in line with the NorCOM association of the telecom industry. And, also in line with the NorCOM strategy, the objective is to make the industry visible, for example through a website on the Internet, and through networking. From the university, Bent Dalum is quoted saying that the precondition for a new industrial cluster is that people from both industry and research institutions participate, and that the necessary research is almost in place.

Jepser Jepsersen from NOVI explained in an interview that within the NorCOM association products for the medico industry using wireless technologies had been the subject of discussions. Some companies also conducted business in that area, for example RTX Healthcare. But, according to Jesper Jespersen, part of the underlying reason why the biomedico community network emerged had to do with the struggle between AAU and NorCOM. The emergence of this network can, according to Jepser Jepsersen from NOVI, be understood as a case where people and communities at the university, in cooperation with local politicians, tried to regain power, and promote other competences and industries. Referring to the discussion in the previous section, that it had irritated the university that NorCOM was not part of the network centre at the university and that it gained so much attention in the media.

"Jespersen: ... When the bio-med community gets up and running, then it was probably generated by what is called the Network Center at the University, right. The Center Network, or whatever it's called, and a desire from Aalborg Municipality to have something they could profile themselves on, or whatever.

Reinau: Then it is back to the power struggle that we had before?

Jespersen: Yes, it's just a power struggle, it has always bothered the Network Center, now named AAU Innovation, that they did not have the power over NorCOM. For 20 years they tried to get permission to manage the NorCOM secretariat, and thus gain the power, right, and they have been successful, here at the very end.

"Jespersen: ... Når biomed community kommer op og stå, det var jo vel egentlig genereret af det der hedder netværkscentret på universitetet, ikke. Center for netværk, hvad det nu hedder, og et ønske fra Aalborg kommune om at have noget man kunne profilere sig på, og hvad ved jeg.

Reinau: Så er det tilbage til den magtkamp vi havde før?

Jespersen: Ja det er jo lidt en magtkamp, altså det har jo altid generet netværkscentret, som nu hedder aau innovation, at man ikke havde magten over norcom. Man har jo i 20 år prøvet om man kunne få lov at styre sekretariatet for NorCOM, og dermed få magten ikke, og det er så også lykkedes i den her sidste ende" (Jespersen 2010)

On the nature of the Biomedcommunity Jesper Jespersen added

"... if you look at the biomed community, well, to me it's an association that has an address book with 40 companies in it and nothing more. They cannot do anything. But I hope, for Christ's sake it is not enough to register that there are 40 companies, some that sell pills and some that make toothpaste I had almost said, and then there are 3-4 companies such as Judex and Nerudan and whatever it is called, that has potential. The others, why should there be a wholesaler, why is there a wholesaler in the biomed community, that has nothing to do with it, right. But they have just tried to make a counterpart within the community and said you can attract some etc etc."

"... hvis du ser biomed community, jamen, for mig at se er det jo en forening der har en telefonbog med 40 selskaber i og mere kan de ikke. De kan ingenting. Men, håber, altså for fanden det er jo ikke nok at registrere at der er 40 virksomheder, der er nogle der sælger piller og nogle laver tandpasta havde jeg nær sagt, ikke, og så er der er 3-4 stykker som judex og nerudan, og hvad det hedder, som kan blive til noget. Altså de andre, hvorfor skal der være en grossist, hvorfor er der en grossist med i biomed community, det har jo ikke meget med det at gøre, vel, altså. Men der har man ligesom prøvet at lave en pendent indenfor det fællesskab, og sagt kan man tiltrække nogle osv osv" (Jespersen 2010)

The biomedico discussion disappears from the discourse in the articles dealing with the NorCOM association as suddenly as it entered. Given the situation where the biomedico community was established as a way of gaining influence from the NorCOM association, it therefore seems plausible, that the NorCOM companies saw the biomedico environment as an enemy. In other words, the biomed community was the first organization to emerge in the region as a counterweight to NorCOM, but not the only, and as such it became the first organization in a series of organizations which together locked the NorCOM association into a position, a box so to say, bound by force relations. Let us now return to another of these.

8.7.3 NorCOM and Mindwork

In 2000 another new organisation also emerged in Northern Jutland, the organization “Mindwork”. An article called “New organization to ensure skilled IT-people in Northern Jutland” (Ny organisation skal sikre Norjylland kvalificerede IT-folk) in *Erhvervsbladet* the 28th of April 2000 described the organisation, as a new organisation which will pull all the forces in Northern Jutland together into one big project, aimed at attracting the necessary work force to the region (Carstensen 2000c). Two consultancy companies have developed the ideas for the company, and the aim is an annual budget of 10 million DKK. Half of this is to come from the industry in the region, the other half from a number of public and semi-public organisations such as AF (Job centres), Aalborg University and the Unions (Carstensen 2000c)

According to Jesper Jespersen, from NOVI, Mindwork was also created by the municipality and the county as a counterweight to NorCOM:

“Well, they got all the money. They received funding from the region or the county, at the time to go out and create Mindwork because they thought that NorCOM was too narrowly focused on Aalborg, right. And then down at Aalborg municipality some people convinced the mayor and his management to create Mindwork and that would include many of the things that were happening in places like Frederikshavn and Hjørring, and what do I know, right. And then we say, well NorCOM is open to companies that want to establish themselves in Frederikshavn, Martin, for example, it might be relevant for them. Then they are welcome, right. We did not want to exclude anybody, but somehow politically they were convinced that Mindwork was better, because they included all of the other IT-companies, you could say. Just like now, where they are all united in BrainBusiness, right. And in that way they managed to politically and perhaps economically hamstring NorCOM a bit. I think they were afraid that NorCOM would become a force that could control the agenda on, what should I say, the industrial development, right. The industrial policy developments in Northern Jutland, and say, that's not what we will do. And there were probably some who thought it was too one-sided, because they saw it as purely mobile phones. They knew, many of the politicians who, like, they just thought it was all about mobile phones, right. It was not the wide range of communication options that came later on, which NorCOM saw, and where a GSM transmitter is built into some medical gizmo that transmits, i.e. remote medicine, telemedicine if you will. And all of the extremely many opportunities that were there”

“Jamen, de fik jo alle pengene. De fik bevillingerne fra regionen, eller amtet, på det tidspunkt, til at gå ud og lave Mindwork fordi man syntes jo NorCOM det var for snævert omkring Aalborg, ikke. Og så sad der nogle nede på Aalborg kommune der ligesom fik overbevist borgmesteren, og hans ledelse om, at man skulle lave Mindwork og så skulle de involvere mange af de ting der foregik i Frederikshavn og Hjørring, og hvad ved jeg, ikke. Og der siger vi, jamen NorCOM den er jo åben hvis der er virksomheder der vil etablere sig i Frederikshavn, Martin, f.eks. hvis det kunne være noget for dem. Så er de velkomne ikke. Det var jo ikke fordi at vi ville udelukke nogle, men på en eller anden måde fik man politisk overbevist om at Mindwork var sagen, fordi, de samlede også alle de andre IT forretninger, kan du sige. Ligesom de nu er samlet i BrainsBusiness ikke. Og på den måde fik man vel politisk og lidt økonomisk måske stikket NorCOM. Jeg tror at man var bange for at NorCOM blev en magtfaktor, der skulle sætte for stor en dagsorden på, hvad skal man sige, op den industrielle udvikling,

ikke. Den industrielle politiske udvikling i Nordjylland, og sige, det er det vi skal gøre ikke. Og der var nok nogle der syntes det var for ensidigt, for de så det jo kun som ren mobiltelefon. De viste, mange af de politikere der ligesom, de troede jo bare at det var kun mobiltelefoner det drejede sig om ikke. Det var ikke den brede vifte af kommunikationsmuligheder som man så sidenhen, som NorCOM jo så, og hvor der er indbygget en GSM sender i en eller anden medicinal dims, som transmitterer, altså fjernmedicin, telemedicin om du vil. Og alle de ekstrem mange muligheder der lå i det" (Jespersen 2010)

The issue of promoting NorCOM and the relationship between the organization and Mindwork, is also discussed internally in NorCOM in this phase

"As it looks now, NorCOM's need for a vigorous recruitment campaign is overall better realized through working constructively with the "umbrella" organization, Mindworks. Mindworks seeks to cover the en-tire electronics / IT industry in Northern Jutland

"Som det ser ud nu, lader NorCOMs behov for en slagkraftig rekrutteringskampagne sig totalt set bedst realisere i et konstruktivt samarbejde med "paraplyen", MindWorks. Mindworks søger at dække hele elektronik/IT branchen i Nordjylland..." (NorCOM 2000c)

According to the same minutes Mindwork represents around 8-10.000 employees at the time (NorCOM 2000c). Niels Christian Gjerrild, who at the time was the chairman of NorCOM and on the board of Mindwork, and as such the link between the organization explained that a work split was made between the two organization:

"... So we had an agreed that Mindwork were in charge of the, the outward-facing marketing of the area. Market campaigns and what were, like extrovert, and then NorCOM would be more inward looking, towards technology. Because NorCOM was narrow in this context in that it was mobile communication, and Mindwork, that included everything in high-tech, IT etc, and of course it al-so included Aalborg Municipality and County Northern Jutland. The university was part of both Mind Work and NorCOM. So it was more appropriate that it was Mindwork that was the marketing partner and then NorCOM was more of a, how to say it, a club for communication companies. That was the division of labor. And it worked quite well to begin with."

"... så vi fik aftalt, at Mindwork stod for den der, den udadvendte markedsføring af området. Markedskampagner og det der, det var sådan det udadrettede, og så ville NorCOM så være mere indadrettet, mod teknologien. Fordi NorCOM var jo snæver i den sammenhæng, at det var mobilkommunikation, og Mindwork, det var alt indenfor højteknologi, IT også, og der var Aalborg kommune og Nordjyllands amt j også med i. Universitetet var med både i Mindwork og i NorCOM. Så derfor var det mere relevant at det var Mindwork der var markedsføringsparten og så NorCOM der var sådan skal man sige, klubben for kommunikationsvirksomheder. Der lavede man den arbejdsdeling. Og den fungerede jo ganske fortrinligt til at begynde med." (Gjerrild 2010)

Minutes from the meetings in NorCOM the following years, show that a recurring discussion at the meetings is promotional material and coordination of such with Mindwork.

Mindwork is presented in the media again the 23rd of June in Ingeniøren, under the heading "Joint efforts for IT-brains" (Fælles indsats for IT-hjerner) (Ravnsborg 2000). This time, the public side of the initiative is literally pulled front and center with the subtitle: "County, Municipalities and private companies are joining forces to promote digital Northern Jutland" (Amt, kommuner og private virksomheder slår kræfterne sammen for at promovere det digitale Nordjylland) (Ravnsborg 2000, p.9). In the same article it is argued that the new organization is reserved for telecommunications companies and software companies. The first tasks which Mindwork will deal with, is the establishment of an international school in Aalborg, to ensure that highly educated newcomers have educational options for their non-Danish speaking children.

Second, plans for a housing reserve for newcomers and third, a “ægtefælleddatabase”, a database of the spouses of the highly educated new-comers, who are often also highly educated. The database is supposed to help these spouses find jobs (Ravnsborg 2000). Mindwork is to be founded officially at a general assembly the 26th of June 2000. The budget will be, as reported earlier, 10 million DKK per annum, and funding will come from Northern Jutland County, the municipalities in the area, EU’s objective 2 funds and private companies who will pay through an enrolment fee and an annual membership fee. The enrolment will cost a company around 150.000-300.000 DKK (Ravnsborg 2000).

The actual driver behind the international School was the NorCOM association, but because of the work split between the organizations it was decided that Mindwork would get the publicity for the school, as Niels Christian Gjerrild explained:

“... the establishment of an international school. Because it is NorCOM in a period, that is where we talk together, as business leaders, well, we have these people and these people who come internationally, and we need children to attend school, etc., and what we do and how do we do it, well, we need to have a school and we talked to Aalborg municipality and we used the association as a, yes, some would call it leverage, and others will say a work-group, depending on what type you are, I would call it a working group, that says we have a need here. For the benefit of all of us and that is when Aalborg municipality happily enters. But they must recognize that they cannot be part of it, they cannot do it legislatively because the Education Act says that Danish is the first language. It does not mean they do not want to help to try to establish it, they go into it very positively. And they try to make it work. And an international school is established, it happens right when Mindwork and all that starts up, so we come to an agreement between NorCOM and Mindwork, NorCOM had already existed for a while, informally at least, but Mindwork is the one taking care of marketing, so Mindwork gets the, you could say, the flowers and the honor of having pulled it off, it is NorCOM. NorCOM enters at one point as a sponsor for the school, and has sponsored some of the school in a period. But that was an example of cooperation between businesses and industry, well, industry and public authorities, on something as practical as an international school”

“.... Etableringen af international skole. Fordi det er jo NorCOM der i en periode, altså hvor vi smækker sammen, som virksomhedsledere, jamen vi har de mennesker og de mennesker der kommer internationalt, og vi har brug for børn skal gå i skole osv, og hvad gør vi og hvordan gør vi, jamen det bliver vi nødt til at skal have en skole, og snakke med Aalborg kommune og brugte simpelthen foreningen som, ja nogle vil kalde det pressions middel, og andre vil sige en arbejdsgruppe som siger, vi har et behov her. Til gavn og glæde for os alle sammen, og det går Aalborg kommune så positivt ind i. Men må også erkende at de kan ikke, de må jo ikke lovgivningsmæssigt gøre det, fordi i folkeskole love står der at dansk er førstesproget. Det betyder ikke at de ikke gerne vil være med til at prøve at etablere det, så de går jo positivt ind i det. Og prøver, er med til at få det her til at fungere. Og det bliver så også til en international skole, det er så lige der hvor Mindwork og sager starter, så blev vi så enige om mellem NorCOM og Mindwork at NorCOM havde jo eksisteret et stykke tid, sådan uformelt i hvert fald, og Mindwork er den der skal markedsføre, så får Mindwork så skal man sige blomsterne og æren af at have gennemført det, det er NorCOM, NorCOM går så også ind på et tidspunkt og er sponsor for skolen, og har sponsoreret noget af skolen i en priode. Men det var et eksempel på samarbejde mellem virksomheder og erhvervsliv, altså erhvervs liv og offentlige myndigheder, om noget helt lavpraktisk som en international skole.” (Gjerrild 2010)

According to an article in Ingeniøren the 11th of August (Jørgensen 2000a), Mindwork was started and 26 members put 4,5 million DKK into the newly started umbrella organisation. Among these some of the big telecom companies in the region: Siemens, Flextronics, Ericsson, Nokia and Maxon. The role of the university in the development of the competences in the region

is highlighted again in this article: " "The high-tech fairytale in Northern Jutland has its roots in a very successful collaboration between Aalborg University's research environment on mobile communication and private companies in the region" (Det højteknologiske eventyr i Nordjylland har rod i et særligt vellykket samspil mellem Aalborg Universitets forskningsmiljø på mobil-kommunikationsområdet og private virksomheder i landsdelen) (Jørgensen 2000a, p.4). Further, the article explains, that the board of Mindwork is aiming for 56 members, and a budget of 30 million DKK over the first three years. The money will be spent on two main issues. One is marketing of the region in Denmark and outside Denmark through advertising, websites and other promotion channels. The other issue is to develop the service provision in the region for newcomers, for example, an international school. The article also explains that AAU is active in the organisation:

"Another Mind Work member, Aalborg University, is also active on the Board, and there are two reasons for this, says Dean Finn Kjærdsdam from the technical-natural sciences faculty: - Firstly, we are a major supplier of graduates to the IT and telecommunications companies in the cluster in Northern Jut-land. Every time we train an engineer, two more are needed. And second, we are even a part of this cluster and experience the same problems as the companies when attracting highly qualified people to Northern Jutland. When we have vacant engineering positions in the hottest areas, we get very few applications, and we must often out and find the candidates for the jobs and encourage them to applying, says Finn Kjærdsdam. He makes no secret that it will probably be felt by the influx of students to the AAU, if the region can agree on a common and strong marketing [policy] and an improve services."

"Et andet Mindwork medlem, Aalborg Universitet, er også aktiv i bestyrelsen, og det er der to grunde til, siger dekan Finn Kjærdsdam fra det teknisk-naturvidenskabelige fakultet: - For det første er vi jo en vigtig leverandør af kandidater til det nordjyske cluster af IT- og telekommunikationsvirksomheder. Hver gang, vi uddanner én ingeniør, skal der bruges to mere. Og for det andet er vi jo selv en del af dette cluster og mærker de samme problemer som virksomhederne med at trække topkvalificerede folk til Nordjylland. Når vi har ledige ingeniørstillinger inden for de hotte områder, får vi meget få ansøgninger, og vi må ofte selv ud at finde kandidater til jobbene og opfordre dem til at søge, siger Finn Kjærdsdam. Han lægger heller ikke skjul på, at det nok også vil kunne mærkes på tilstrømningen af studerende til AAU, hvis man i regionen kan blive enige om en stærk, fælles markedsføring og et forbedret serviceudbud." (Jørgensen 2000a, p.4)

Another article in *Ingeniøren* called "The regions step up to fight for IT-money" (Regionerne opruster til kamp om IT-kronerne) the same day, argues, that the regions in Denmark will compete against each other for funding for IT:

"All the Danish regions are touting their horns, extolling their virtues to foreign companies and highly skilled employees, and competition will undoubtedly intensify in the coming years. However, Fyn has no intention of standing idly by while for example the Aalborg area increasingly dominates IT investments, underlines Mayor Finn Brunse from Tommerup Municipality. Finn Brunse is chairman of the Organization Information Society Fyn, which, like Northern Jutland's Mindwork is an association that brings together private companies and public authorities and institutions"

"Alle danske regioner slår på tromme for hver deres fortræffeligheder over for udenlandske virksomheder og højt specialiserede medarbejdere, og konkurrencen vil utvivlsomt skærpes i de kommende år. Men på Fyn har man ikke tænkt sig at se passivt til, at f.eks. Aalborgområdet sætter sig tungere på IT-investeringerne, understreger borgmester Finn Brunse fra Tommerup Kommune. Finn Brunse er formand for organisationen Informations Samfund Fyn, som i lighed med nordjyske Mindwork er en forening, der samler private virksomheder og offentlige myndigheder og institutioner." (Ravnsborg & Jørgensen 2000, p.4)

In the minutes from a Board meeting and a Members meeting in NorCOM the 22nd of August 2000 the relation between NorCOM and Mindwork is discussed again. It is stressed in the minutes that NorCOM is a professional based cooperation around wireless communication:

"MINDWORK is the broad-based working platform that can profile itself widely, and northern Jutlandish in recruitment campaigns, while NorCOM is the academically-based cooperation that can work in depth with wireless communication."

"MINDWORK er den bredt funderede og arbejdende platform, der kan profilere sig bredt, nordjysk i forbindelse med rekrutteringskampagner, mens NorCOM er det fagligt baserede samarbejde, der kan arbejde sig i dybden omkring wireless communication." (NorCOM 2000a Original Italics)

It is discussed how the relationship between NorCOM and Mindwork should be going forward. Currently, it is two separate associations with two different boards. The minutes show that it has been discussed that a possible option could be an umbrella structure, where NorCOM remains a professional club under the broader Mindwork framework. The minutes also show that there is a wish for recruitment campaigns among the members:

"The members' meeting endorsed the Board's considerations and stressed the importance of maintain-ing NorCOM's activities and a professional collaboration with MINDWORK. The members' meet-ing especially looked forward to MINDWORK quickly realizing the recruitment campaigns, and promo-tion of Northern Jutland as an exciting and attractive area to live and work."

"Medlemsmødet tilsluttede sig bestyrelsens overvejelser og understregede vigtigheden af at fastholde NorCOMs aktiviteter og et professionelt samarbejde med MINDWORK. Medlemsmødet ser især frem til, at MINDWORK hurtigst muligt kan realisere rekrutteringskampagner og profilering af Nordjylland som et spændende og attraktivt område for bosætning og arbejde." (NorCOM 2000a)

Until Mindwork starts, the NorCOM association will work on the issue by conducting a campaign to attract more visitors to the NorCOM website." (NorCOM 2000a).

Mindwork starts the promotion in this phase and Ingeniøren announces in the article "Olympic sponsorship to provide engineers to Northern Jutland" (OL-sponsorat skal skaffe ingeniører til Nordjylland) the 29th of September 2000, that Mindwork has spent 1,6 million DKK on a Olympic sponsorship. The name Mindwork is to be mentioned at the beginning and end of all the transmissions from the Olympic Games on the Danish TV channel DR (Jørgensen 2000b). The 1,6 mill is according to the article around 1/3, of that 4,7 million the 28 current members of Mindwork has put in the organization. The article is critical and questions if the money was well spent since the only thing that is shown on TV is the name, web-site and logo. The chairman of the board argues that it was well spent, and draws on his experience from Sonofon where he is CEO. Sonofon had a similar campaign during VM in 1996 which was successful. The article ends with a statistics, which show that the Mindwork campaign is not performing as expected:

"Det konkrete mål for OL-sponsoratet var 50.000 daglige hit på Mindworks hjemmeside. Men de første tal ligger langt under. Ifølge Ingeniørens oplysninger ved redaktionens slutning havde hjemmesiden kun godt 1.000 hit i alt i perioden fra søndag den 17. til lørdag den 23. September" (Jørgensen 2000b, p.4)

Ingeniøren reports the 27th of October that Mindwork has created a database for spouses of people working in member companies, to help these spouses, who are also often highly educated, find jobs (Nielsen 2000). The database is also mentioned in articles in 2001.

Mindwork and the issue of attracting highly educated employees is mentioned in Jyllands-Posten again the 15th of November (Bastholm 2000). This time it is presented as the most expensive association in Denmark due to the high membership fees. The association has now, according to the article, around 15-16 million DKK which is budgeted to last until 2003. This means, going back to the earlier articles, that the budget for the first three years have been cut almost in half.

The focus on the human side of the cluster and the statement about the importance of the relationship between the companies, the university and Mindwork, is also illustrated in the fact that the "Northern Jutland Engineer Price 2000" (Nordjyske Ingeniørpris 2000) was given to Tage Rasmussen on the 16th of December 2000, who was former CEO at Sonofon, and at the time CEO of Pre-Tel Wireless, because he, quote

"... very much represents modern engineering in Northern Jutland. He has built bridges between the business community in Northern Jutland and research at Aalborg University and has been active in the creation of Novi and the organization NorCOM and the Professional Association Mindwork, which focuses on the mobile phone industry in Northern Jutland"

"... i høj grad repræsenterer det moderne ingeniørarbejde i Nordjylland. Han har bygget bro mellem erhvervslivet i Nordjylland og forskningen på Aalborg Universitet og været aktiv i oprettelsen af Novi og organisationen Norcom samt erhvervssammenslutningen Mindwork, som sætter fokus på mobiltelefonbranchen i Nordjylland." (Stougård 2000, p.5)

Ingeniøren reports the 28th of September 2001 that Aalborg University and Mindwork are working on a new research school. The idea is that people who have worked for two years in one of the companies, can get a research education from AAU, and the rationale for this is to attract talented engineers to the companies in the region as well as gain applicants for the research positions at AAU (Nielsen 2001)

A number of articles follows in 2001 and 2002 which mentions Mindwork, and they all tell similar stories about how Mindwork has helped people find jobs in the industry, for example after the closure of Ericsson in the cluster.

Erhvervsbladet reports the 13th of February 2002 that the focus of Mindwork has been broadened, and now the organisation is trying harder to attract workers from outside Denmark. This is done through the appointment of so-called ambassadors around the world, to increase the awareness around the organisation (Carstensen 2002). In 2002 it is also announced that Mindwork is starting a strategic cooperation with the IT-trade organization, as well as ITEK which is short for Danish ICT and Electronics Federation. RB-Børsen reports on the collaboration the 15th of April:

"The purpose of the association is to provide a framework for professional and collegial interaction between member companies and associated companies. ITEK is nationwide with headquarters in Copenhagen. The Mindwork Association's mission is to attract and retain highly educated workers in the IT environment of Northern Jutland, including research, development and production, and it currently has 40 members, both private and public companies

"Formålet med fællesskabet er at danne rammer om et fagligt og kollegialt samvirke mellem medlemsvirksomheder og associerede virksomheder. ITEK er landsdækkende med hovedkontor i København. Foreningen Mindworks mission er at tiltrække og fastholde højt uddannet arbejdskraft i det nordjyske IT-miljø, herunder forskning, udvikling og produktion, og har i øjeblikket 40 medlemmer, såvel private som offentlige virksomheder" (RB-Børsen 2002)

The broad focus of Mindwork also create problems, for example, when the organization tries to attract suppliers from outside the region; some supplier companies within the region sees this as direct competition. Niels Buus, former chairman of NorCOM and CEO of the telecommunication company Gatehouse thus explained:

"I remember we were members of Gatehouse too, then at some point, we are trying to see if they could find subcontractor for consulting in the Baltic countries. Then we left, for it was in direct competition with us. That was not a smart move, but whatever the reason was, I do not know, there could have been a good reason for it. But it could not continue as it was."

"... jeg kan huske vi var medlem i Gatehouse, så på et tidspunkt, så er vi ved at prøve at se på om de kunne finde underleverandører på konsulentopgaver i de baltiske lande. Der meldte vi os ud, for det var i direkte konkurrence med os. Altså det var ikke et smart træk, men hvad grunden var, det ved jeg ikke, der kunne være en god grund til det. Men det kunne ikke blive ved med at gå rundt." (Buus 2010)

Mindwork continues until 2004, where it is shut down, because of an expected deficit the following year of 650.000 DKK, as reported by Berlingske.dk the 29th of December 2004 (Berlingske.dk 2004b). Niels Christian Gjerrild explained that after this NorCOM takes on the challenge of promoting the region again.

"... then Mind Work begins to creak a little and nothing really happens. And, well, we have an agreement, so we stick to it. And then Mindwork close the shop because they cannot get the ends to meet financially, and that is at the same time as Niels Buus takes over as the chairman ..

.... and so the board looks at each other, and says that was not good. Now nobody is doing marketing anymore. Then we will have to do it. And NorCOM starts to that seriously in 2006. Yes, that's it. And the reason I can say that with such certainty is because when I establish my own company in 2005 and the first job I got was how to marketed NorCOM specifically to engineering students in order to attract more competent engineers to the area ..."

"...Så begynder Mindwork jo sådan at knirke lidt, og der sker ikke rigtigt noget. Og, nå ja, vi har jo en aftale, så det holder vi os til. Og så lukker Mindwork butikken ned, fordi de kan ikke få det til at gå rundt sådan rent økonomisk, og det er samme tidspunkt som der hvor Niels Buus han så overtager formandsstolen...

.... og så kikker på på hinanden i bestyrelsen og siger, det var jo ikke så godt. Nu er der jo ikke nogen der laver markedsføring længere. Det bliver vi nødt til at gøre. Og det begynder NorCOM jo så for alvor at satse på i 2006. Ja, det er det. Fordi, og når jeg kan sige det så specifikt er det jo fordi da jeg etablerer mig som selvstændig i 2005, og den første opgave jeg fik var nemlig at arbejde med hvad kan vi markedsføringsmæssigt gøre for at markedsføre NorCOM specifikt overmod ingeniør studerende for at tiltrække nogle flere kompetente ingeniører til området..." (Gjerrild 2010)

On the closure of Mindwork, Jesper Jespersen explained the following:

"Well, the basic idea of Mindwork probably did not hold. It held, well theirs, the way they wanted to run it, control it that did not hold. The political ulterior motive with Mindwork, you can say, did not hold. They tried to do too much, they tried to market the whole of Northern Jutland, and widely, etc etc. Eventually, the county, back when it was still called the county, probably had some philosophy, some campaign called "the taste of Jutland", or something, right. Some years ago, there was a very strong, you could say, from the telecom's side, need to get promoted [...], so they made a big event in connection with the Vienna Philharmonics, who was here once, getting them to perform at Falconer Center, [Concert hall in Copenhagen] right. And they made sure that there were hard candy from Brovst in Northern

Jutland, and what the hell do I know, and dark bee honey from Læsø, and such things, right, it was mistimed completely, I think, from the view of NorCOM, also from Mindwork, they wanted to try to make it a high-tech event, if you will right. To show the companies in Copenhagen and the foreign companies present in Copenhagen, there is something worth going to Aalborg for. And then on top of that, that we can do a lot, we are also giving you a concert with the Vienna Philharmonic, they had played in Aalborg once, and they demanded that if they were to play again in Denmark, then it should be in Copenhagen, and the queen should attend, and so she did. But all the politics there, it was too much politics where they, the politicians wanted to determine how the development should be, and of course it's also their job and they should be allowed to."

"Jamen, den basale ide for Mindwork kunne vel ikke holde. Den holdt, altså deres, den måde de ville drive det på, kontrollere det på, den holdte ikke. Altså, den politiske bagtanke med Mindwork, kan du sige, holdt ikke. Man prøvede at gøre meget, man prøvede jo at markedsføre hele Nordjylland, og bredt, osv osv, Men det endte jo op med at amtet havde, dengang det hed amtet, havde vel en eller anden filosofi, en eller anden, kampagne de kaldte smag på Nordjylland, eller et eller andet, ikke også. For nogle år siden, og der var jo et meget kraftigt, kan man sige, fra telesiden, behov for at få promoveret sig og trukket sig ud, og så lavede man et stort event i forbindelse med Wiener Philharmonikerne, der var her engang, få dem til at optræde i Falkonercentret, ikke. Og de gik jo så op i, at der stod nordjyske bolsjer fra Brovst, og hvad fanden ved jeg, og brun bi honning fra Læsø, og sådan nogle ting og sager, ikke, det var mistimet fuldstændigt synes jeg, set ud fra det synspunkt, at det var NorCOM, også ud fra Mindwork, man ville ligesom prøve at lave det til et højteknologisk event, om du vil, ikke også. For ligesom at vise de københavnske virksomheder og de udenlandske virksomheder, der er i København, at der er altså noget at hente i Aalborg, og komme med. Og så oven i hatten, med at vi kan en masse, så giver vi jer også en koncert med Wiener Philharmonikerne, fordi de havde jo spillet i Aalborg en gang, og deres krav var at hvis de skulle spille igen i Danmark, så skulle det være i København, og så skulle dronningen deltage, og det gjorde hun så også. Men, og alt den politik der, det blev for meget politik, hvor de for politikkerne der ville til at bestemme hvordan udviklingen skulle til at være, og det er selvfølgelig også deres job, og det skal de have lov til. (Jespersen 2010)

According to Jesper Jespersen, the critical involvement of the municipality was also due to the issue of Flextronics. People in the NorCOM cluster said that production was doomed in the cluster, and focus had to be placed on R&D, while the municipality was still struggling to maintain the production jobs in the region. Some industry organizations, for example DI, Danish Industry, joined the municipality in this struggle:

"... in NorCOM we said that we did not want to talk to the Danish Employers' Association, we cannot be bothered talking to Danish Industry either, now let them do what they can, right. They were that too, so they joined up with the politicians and thought, that it was terrible that there was an organization that had the money to do something, right. We created our own job fair here, without asking them first, right. And we did a job fair over at DTU [Danish Technical University], and just say, well, we need engineers, we need computer scientists, we need IT people - come to Aalborg, right"

"... vi sagde jo i NorCOM, at vi gider sku ikke snakke med dansk arbejdsgiverforening, vi gider heller ikke snakke med dansk industri, lad nu dem køre det de kan, ikke. Det var de jo så også, de hoppede så sammen med politikkerne, og syntes, at det var noget værre noget der sad sådan en organisation der havde penge til at gøre noget, ikke. Vi lavede jo vores egen jobmesse her, uden at spørge dem, ikke. Og vi lavede en jobmesseovre på DTU, hvor de, og ligesom sige, jamen, vi mangler ingeniører vi mangler dataloger vi mangler it folk, kom til Aalborg ikke." (Jespersen 2010)

We see again here, that according to Jesper Jepsersen Mindwork failed because it was driven by politicians, and too many different issues were therefore taken into consideration. And the

events around the concert in Copenhagen seems to have supported the view among people in NorCOM, such as Jesper Jespersen, that it was important to keep politicians away from the power in NorCOM.

Having now discussed the relationship between Mindwork and NorCOM, we see that again the issue was that although Mindwork and NorCOM cooperated and supported each other in relation to the promotion of the region, the relationship was also imbued with power relations in a much as Mindwork was an initiative also started to balance the impact of NorCOM. Let us now return to the counterweight to NorCOM which took over from Mindwork, IT Forum.

8.7.4 The relation to IT Forum

After the closure of Mindwork, a new organization emerged in Northern Jutland, IT Forum, which actually started out as IKT Forum. This was an outcome of a tendency nationwide in Denmark towards the establishment of organizations to support the IT industry, and this tendency was promoted by politicians in Northern Jutland too. According to interviews they used the opportunity to create a new organization as a counterweight to NorCOM, which they saw as being too narrow both in relation to the telecommunication industry as well as too geographically narrow with its focus in and around Aalborg, causing other industries and parts of the region to be overshadowed.

"Well, then came IT forum, right, and that was supposed to be nationwide, now all the regions or counties, should have such an IT forum, right. And then up here they rushed to throw in a K [Communication is spelt with a K in Denmark] as well...

... And then NorCom says, [knocks on the table] we are fucking well sitting on the communication part. Call it IT forum and run your businesses, then we will run ours. Then there was this political debate again, right. But since we made that job fair, and job events, and other things, we were also in Stockholm to market NorCOM and the NorCOM companies to attract workers back when it was at its peak right, well, so we got just no funding. The Region, the area, we got no damn funding to help us attract workers to the area. And that was channeled to the IT-Forum. And then somebody from IT forum would come out and comment about how horrible it was etc etc,"

"... så kom IT forum, ikke, og det var jo en tanke der var landsdækkende, nu skulle man altså have sådan alle regioner eller amter, skulle have sådan et IT forum ikke. Og så heroppe der skyndte man sig lidt og ligge K'et ind..."

... Og så siger Norcom, [banker i bordet] det er fanme os der sidder på kommunikationsdelen. Kald det IT forum, og køj jeres business, så køjer vi vores business. Så var der sådan politisk debat igen, ikke også. Men i og med, at vi lavede det der jobbørs, og jobevents, og andre ting, vi var også i Stockholm og markedsføre NorCOM og NorCOM virksomhederne for ligesom at tiltrække arbejdskraft dengang det var hottest ikke, jamen, så, vi fik jo bare ingen bevillinger. Regionen, området, vi fik sku ingen bevillinger til ligesom at hjælpe os med at tiltrække den arbejdskraft her til området. Og den kanaliserede man over i IT forum. Og så fik man jo så nogle i IT forum til ligesom at udtale sig, altså det var også forfærdeligt osv osv" (Jespersen 2010)

Niels Buus added to the rationale of the county and municipality:

"So they started IT Forum, and it was because they wanted people with IT in it. And after a while and it is a long story, which Jørgen Hedevang can explain better than I can. There was disagreement about who should get what and do what, and there were some failed manoeuvres to merge at the time, but it was largely controlled by the university. And it was run by the university, as part of the, that part Niels Maarbjerg has, I cannot remember what it's called. And we are an industry organization, we will not be controlled by the university, we

will not be controlled by the Region, we want it to be on an industrial basis, because we are trying to get to a point where we can do business with it, that failed, and today those are the ones who are left, and Grimor Lund has done a fantastic job, I want to say that, in there, but we had Danish industry in on it on the sidelines. We did not want to create what is it called, jobs in the secretariat for them, when they have nothing to do in the region, then the money could just as well go to keep those jobs, i.e. some of the money they should be giving out through the Growth Forum”

“Så startede de IT forum, og det var fordi de ville have IT folkene med. Og efter noget tid, og der ligger en lang historie bag ved det, den kan Jørgen Hedevang bedre redegøre for end jeg kan. Der var uenighed om hvem der skulle have hvad og gøre hvad, og der var nogle forføjlede sammenlægningsmanøvre på det tidspunkt, men den var jo i høj grad styret af universitetet. Og den var styret af den del af universitetet som, den del som Niels Mårbjerg har, jeg kan ikke huske hvad det hedder. Og vi er en industri organisation, vi vil ikke styres af universitetet, vi vil ikke styres af regionen, vi vil være det på en industriel basis, fordi vi prøver at komme frem til at lave forretning med det, det lykkedes ikke, og i dag er det dem der står tilbage og Grimor Lund har lavet et fantastisk stykke arbejde, det vil jeg gerne sige, i det der, men der havde vi Dansk Industri med også på sidelinjen. Vi ville ikke være med til at skabe, hvad hedder det, sekretariats arbejdspladser for dem, når ikke nogen har mere at lave ovre i en region, fordi så kunne regionspengene så kunne de lige passende gå over til at køre videre, altså nogle af de penge de skulle give ud i vækstforum.” (Buus 2010)

The differences between the two associations were also due to the fact that whereas NorCOM was financed privately, IT Forum was supported by public funds. People in NorCOM remained sceptically of public influence and did not want the municipality to gain power over the association. As mentioned earlier, some people in NorCOM believed that some of the events surrounding Mindwork had proven that too much inference from politicians was negative.

Hedevang: ... well I think I can really only, I can probably only understand it from considerations of a model, a model, i.e. the organizational models were different. NorCOM held pretty tightly on to, well, those who had created NorCOM and ran NorCOM and paid membership fees and were on the different boards, they emphasized that it is an industry organization that collaborates with all relevant parties; public, county, municipality, the university's research departments and education departments, but that it was an industry organization that paid its own membership fees and were independent of political structures, i.e. an independence so that we can talk about an industry. And not by virtue of being financially dependent on public funds, or any other fund, which will mute, shall we say, the industry's own voice. That was the basic view of NorCOM. The idea was never, in the discussions there have been, because there's been, shall we say friendly discussions all the way. When I say a takeover that was not successful, then it all took place rather peacefully. Nobody cried or screamed or anything like that. But I think from IKT forum's side, there was an entirely regular organizational attempt to see if they could get the K side in to a single organization, and that makes sense, we can see that today, today that means both the K and I side. And they believed so even back then, but what separated them was the organizational model. It would, it is certainly my interpretation, or that's my interpretation. I think there are others who interpreted it that way too. So who has the power, politicians have the power or the industry has power. Currently, if you look at the financing of the current ICT NorCOM, I do not know if you've done that?

Reinau: No, I have not had the opportunity to

Hedevang: So is the funding relationship between public and private dollars 17 to 1. There are 17 public DKK for every private DKK in that association.

Reinau: Is it not a tremendously large

Hedevang: That is just, it has evolved quite explosively away from industry having anything to say, financially.

“Hedevang: ... jeg kan nok kun forstå det ud fra sådan en betragtning om at en model, en model, altså organisationsmodellerne i det var forskellige. Altså NorCOM stod jo ret, altså dem som ligesom havde skabt NorCOM og drev NorCOM og betalte kontingentet og udgjorde de løbende bestyrelser, de stod jo rimeligt fast på at det er en industri organisering, som samarbejder med hvem det kunne være, offentlige, amt kommune, universitetets forskningsside og uddannelsesside, men at det var en industriorganisation der selv betalte sine kontingenter, og var uafhængige af de politiske strukturer, altså, den der uafhængighed således at man kan tale om en industri. Og ikke i kraft af at være økonomisk afhængig af en offentlig kasse, eller noget andet kasse, som kommer til at skulle dæmpe, skal vi sige, industriens egen stemme. Det var grundsynspunktet i NorCOM regi. Den ide blev aldrig, i de drøftelser der har været, fordi der har jo været skal vi sige venskabelige drøftelser hele vejen hen. Når jeg siger en overtagelse der ikke lykkedes så foregik det jo i alt sådan rimelig fredsommelighed. Der var ikke nogen der hverken råbte eller skreg eller noget. Men et, jeg mener fra IKT forums side var det et helt regulært organisatorisk tiltag om at se om ikke man kunne få K siden med i en samlet organisering, og det giver også mening, det kan vi jo se i dag, at det mener så både K og I siden i dag. Og det mente de for så vidt også dengang, men det der skilte, det var den der organisationsmodel. Det ville, det er nok min tolkning, eller det er min tolkning. Jeg tror også godt der er andre der tolker det sådan. Altså hvem har magten, har politikerne magten eller har industrien magten. I den nuværende, hvis du kikker på finansieringen af det nuværende ICT NorCOM, Jeg ved ikke om du har gjort det.

Reinau: Nej, det har jeg ikke haft lejlighed til

Hedevang: Så er finansieringsforholdet mellem offentlige og private kroner 17 til 1. Der er 17 offentlige kroner for hver 1 krone privat i den forening.

K: Er det ikke en enormt stor

Hedevang: Det er jo, det har udviklet sig helt eksplosivt kolossalt væk fra at industrien har noget at skulle have sagt, rent finansielt.” (Hedevang 2010)

The technological development towards the end however meant, that a rationale for a merger with IT Forum emerged:

“Hedevang: ... the technology development has of course gone, and the commercialization, well, how do you commercialise, how do you run a business on these technological bases that has moved a lot.

Reinau: How did that affect NorCOM or how did that dynamic show itself?

Hedevang: Well, it turns out after all of that the, this total hardcore wireless profile as NorCOM first and foremost represented, that it's not so important anymore, because the technologies disseminate into each other. And then other types of solutions emerge. So, it is only logical that information technology and communications, merges so to speak. And it meant that the interest, i.e. the number of members and the members left, their interest in having an independent NorCOM, I would say it weaned. The Board could very well see that. And you can say the main political interest continued to focus on IT, the IKT forum. It was obvious.

“Hedevang: ... teknologiudviklingen er jo også gået, og kommerialiseringen, af altså, hvordan kommerialisere man, hvordan laver man forretning på de her teknologiske baser, har jo flyttet sig meget.

Reinau: Hvordan har det spillet ind på NorCOM, eller hvordan har det vist sig den dynamik.

Hedevang: Jamen, det viser sig jo ved, at så er den der helt hardcore wireless profil som NorCOM jo først og fremmest tegnede sig som, så er den jo ikke så betydningsfuld længere, fordi teknologien diffunderer ind i hinanden. Og bliver til nogle andre typer af løsninger. Så er det jo også logisk at, informationsteknologi og kommunikationsteknologi så at sige merger. Og det betød jo også at interessen, altså antallet af medlemmer, og de medlemmer der så var, deres interesse i at have et selvstændigt NorCOM, vil jeg sige, den blev jo mindre. Det kunne bestyrelsen jo godt se. Og man kan sige den politiske hovedinteresse blev ved med at ligge på IT. Altså IKT forum. Det var tydeligt." (Hedevang 2010)

One boundary was the political as we have seen earlier, another one was technological. Whereas the merger between NorCOM and IT Forum did not make sense seen from a technological standpoint in early 2000s it did so the late 2000s. In the early 2000's the IT industry was for example covering everyone who could make a website, and there were at that time a large distance between making a website and making something for a mobile phone. However, at the two industries merged and focus towards the end of the 2000s was placed on for example applications for smart phones in the wireless market, a technological rationale for cooperation between the two industries emerged. To understand the emergence and presence of two other important discourses within the region, we now need to go back to some of the discussions emerging around 2000.

8.7.5 The argument that Dancall could have been Nokia

In the beginning of 2000 the entry of MNCs in the NorCOM cluster is emphasized yet again, this time under the heading "Mobile telephony: Overseas [investors] flock around successful Danish mobile telephony" (Mobiltelfoni: Udlandet flokkes om succesrig dansk mobiltelefoni) in Jyllands-Posten the 5th of August (Nordhagen 2000d) However, this time the statement about the success is combined with a statement about a lack of ability to think big in Denmark, in relation to the lack of venture capital, quote:

"Had the Danish investors had a tradition of thinking big the mobile phone industry in Northern Jutland could have been Danish-owned. Instead, foreign groups are investing in everything that moves in the area."

"Havde danske investorer haft tradition for at tænke stort kunne mobiltelefonindustrien i Nordjylland have været dansk ejet. I stedet er det udenlandske koncerner, som investerer i alt, hvor der rører sig på området." (Nordhagen 2000d, p.2)

And this critique comes from the chairman of the NorCOM association, quote:

"The Danes are full of good ideas, but they are not always thinking internationally when it comes to creating something big in an industrial context. That is why the growth in the electronics adventure in Northern Jutland mainly happens with foreign investments. This says the chairman of the organization NorCOM that counts a large number of companies and institutions active in research, development and production of mobile and wireless communications. And that is why the lists of members of NorCOM among others includes names such as Ericsson, Nokia, Siemens, Texas Instruments, Telital, EuroCom and not least Flextronics, 13 of the 18 development and production companies are foreign owned. The 13 companies employ more than 3400 employees. There is no reason to complain about the development, since foreign investors are investing in Danish workplaces and Danish know-how, says NorCOM President Niels-Christian Gjerrild: "It is only the beginning of something much bigger than what we are seeing today"

"Danskerne er fulde af gode idéer, men tænker ikke altid internationalt, når det gælder om at skabe noget stort i industrisammenhæng. Derfor sker væksten i det nordjyske elektronik-eventyr i dag hovedsageligt med udenlandske investeringer. Det siger formanden for organisationen Norcom, der tæller en lang række virksomheder og institutioner indenfor forsk-

ning, udvikling og produktion af mobiltelefoni og trådløs kommunikation. Og derfor står der blandet andet Ericsson, Nokia, Siemens, Texas Instruments, Telital, EuroCom og ikke mindst Flextronics på listen over medlemmerne af NorCOM, hvor 13 af de 18 udviklings- og produktionsselskaber er udenlandsk ejede. De 13 selskaber beskæftiger tilsammen over 3400 ansatte. Der er heller ingen grund til at beklage udviklingen, for udlandet investerer i danske arbejdspladser og i dansk knowhow, siger Norcoms formand Niels-Christian Gjerrild: "Det er kun begyndelsen på noget meget større end det, vi ser i dag" (Nordhagen 2000d, p.2)

It is important to note here that the leader of NorCOM places the blame for the many foreign-owned companies outside the cluster. The blame is placed outside the cluster, on Denmark in general, and is due to a Danish lack of willingness to think big. It is thereby, turned into a problem which is external to the cluster. It is a problem which influences the 'us' within the cluster, who are good at technology, but the problem lies with people 'outside' the cluster, with 'them' constituted in this case by business people and investors in Denmark, who have not been willing to invest enough in the cluster.

There is an important link here to earlier statements about the cluster. We have seen, that during the years leading up to this statement, NorCOM has been presented as a success, or even stronger, as a fairytale story, a wording which is also repeated in this article. Furthermore the success is repeatedly attributed to research and development at the university and in the companies in the cluster. This R&D results in new ideas, which again results in new companies. The ability to attract MNCs was in previous articles seen as something good, and it still is in this article. The statement above is just finger pointing by NorCOM, saying that it is not 'our' fault that this fairytale is not Danish owned, it is your own fault, Denmark.

Also stated explicitly in this article is a statement, which was seeping through the consciousness of people in the cluster. A statement which was repeated again and again in lunchrooms and in front of coffee machines in the cluster. The statement was:

"Among the seasoned players in the industry there is talk about how Dancall could have evolved in-to Denmark's answer to Nokia. The opportunities were there, but the Finns were better and did not lack investors ...

... Dancall did, that is why the company's crisis in 1993 ended with a sale, first to British Amstrad, then to Bosch Telecom, and finally to Siemens and Flextronics, which have seen opportunities in the Development division with 400 employees and in production with 1300 employees."

"Blandet de garvede aktører i branchen tales der om, at Dancall kunne have udviklet sig til Danmarks svar på Nokia. Mulighederne var til stede, men finnerne var dygtigere og manglede ikke investorer...

... Det gjorde Dancall, hvorfor selskabets krise i 1993 endte med salg til først britiske Amstrad, derefter Bosch Telecom og sidst til Siemens og Flextronics, som har set mulighederne i henholdsvis udviklingsafdelingens 400 medarbejdere og i produktionen med 1300 ansatte". (Nordhagen 2000d, p.2)

It is important to note that in this article another statement is also made, which is that the foreign ownership, seen from the "Danish" perspective represented by the CEO of the industry association for the electronic industry in Denmark Jan Zneider, was a coincidence. No large Danish players were around to support Dancall in 1993. However, people are good at coming up with new solutions in Aalborg, which may attract foreign companies who need new products. This is a re-articulation of the statement that technology is the key driver to success. But he also stresses that foreign ownership can be a dangerous situation, quote: ""

" Whether that is a good thing in the long run depends on whether they stay in this country, but right now things are pretty good in Northern Jutland "says Zneider"

"Om det så er godt i længden afhænger af, om de bliver her i landet, men lige nu går det ganske godt i Nordjylland" siger Zneider" - (Nordhagen 2000d)

The year 2000 marked the end of the Internet bubble, which had been growing continuously for five years at the time, where the stock value of Internet value had risen far above the real value of the industry (www.britannica.com 2010).

The ripples from when the Internet bubble burst reached NorCOM in 2001, judging from the newspaper articles. In April of 2001 Flextronics had to lay off 474 workers, or in other words, 1/3 of its employees, as discussed earlier. According to the company, the reason was the state of the world economy, as explained in (Berlingske.dk 2001). As also mentioned earlier the chairman of NorCOM, Niels-Christian Gjerrild, was surprised to learn about the cuts, but not surprised that it hit Flextronics, because being an electronic manufacturing company, Flextronics was dependent on orders from handset producers, and when they made cuts, it hits suppliers such as Flextronics. Still, the chairman does not believe that the crisis will hit the other companies in the cluster, because they are developing the products of tomorrow:

"Niels-Christian Gjerrild do not think NorCom's other smaller Danish companies suffer to the same degree, as they are development companies for the future of telecommunication. They work with technologies that we might see in Danish homes in two years' time, and therefore are not directly dependent on the current economy, he says"

"Niels-Christian Gjerrild mener ikke, at Norcoms øvrige mindre danske virksomheder rammes i samme grad, da de er udviklingsselskaber for fremtidens telefoni. De arbejder med teknologier, som vi måske først ser i danske hjem om to år, og er derfor ikke direkte afhængige af den aktuelle økonomi, siger han" (Berlingske.dk 2001, no page number)

What we see here is a statement which exists in a functional relationship with the preceding statements about the technological competences as key to the cluster. The story has been, as we have seen, that the NorCOM companies are leading technologically, create new ideas, and these ideas form the basis of new companies. And this will, as the argument goes, attract foreign capital and keep it in the cluster. We also saw a statement earlier, that engineers and their knowledge are the core of the success. A lack of financial competences was articulated as an issue which could limit the success of the region in the early 1990, but as we have seen, this statement disappeared from the discourse around the cluster in the following ten years, and was replaced with the statements that placed technology and the continuous development of new technology as the key dynamics behind the cluster. In the quote above we see that this statement; that engineers with their knowledge are more important than financial issues, it underscored even further.

Basically, Niels-Christian Gjerrild is saying, that because of their knowledge the small Danish companies in the cluster is partially detached from, and not dependent upon, the current financial situation. In other words, this article marks the climax in the discourse regarding technology as the key driver in the cluster. Here the statement is made so strongly that it is explicitly stated that the current financial situation has no effect on the companies. The companies with their technological work areas are not connected to the business and financial world. Instead they exist in some kind of technological development world detached from the general economy.

This statement also implies a distinction between engineering knowledge and economical issues, where engineering knowledge is placed above economical issues; if the knowledge is 'right', then the companies will not be dependent on the financial situation. The article further men-

tions the bidding rounds for UMTS licenses as a factor contribution to the cut-backs by the global players in the industry, and hence also a factor in why Flextronics is laying off people.

Five days later, the statement that technology will save the day, is repeated in the same paper, this time under the heading "Development creates more development" (Udvikling skaber mere udvikling) (Vahle 2001). In this article it is explained, that because of the focus on technology in the cluster, it will have an almost guaranteed chance of survival:

"Almost regardless of how wireless technology evolves, Northern Jutland still has good opportunities to educate researchers, create new businesses that are ahead technologically and attract additional development from multinational corporations. The region has developed a strong competence which it is crucial to maintain, says a researcher who has specialized in finding out why and how geographic knowledge centers like Silicon Valley emerge"

"Næsten uanset hvordan den trådløse teknologi udvikler sig, vil Nordjylland fortsat have gode muligheder for at kunne producere forskere, nye erhvervsvirksomheder, der er foran med teknologiudviklingen og tiltrække yderligere udviklingsaktiviteter fra multinationale selskaber. I landsdelen har man udviklet en stærk kompetence, som det er afgørende at vedligeholde, påpeger en forsker, der har specialiseret sig i finde ud af, hvorfor og hvordan geografiske videncentre i stil med Silicon Valley opstår." (Vahle 2001, p.8)

Bent Dalum further explains, according to the article, that although the big commercial successes like Nokia and Ericsson have not taken place in the cluster, then the cluster has been capable of creating a number of engineers who are wanted, and Northern Jutland has been able to attract engineers, although it is a peripheral area. This is an interesting statement, which has a functional relationship to the one discussed above. Here engineers with specific knowledge are not placed above financial issues, but what it said is that it is not problematic that the companies does not have large commercial successes as long as they develop and attract skilled engineers. Again, the objective it seems, is not positive financial outcomes or commercial success, the objective seen from within the cluster is the production of technical engineering knowledge, and the ability to attract talent, because it is believed, that this knowledge will ultimately be what saves the day and ensures the future existence of the cluster. Bent Dalum further explains in the article that innovation is the key.

Little more than six months later the crisis in the IT- and telecom has made its mark on the cluster. In an article with the heading "4G is the way forward" (4G er vejen frem) it is explained, quote:

"The connection to Northern Jutland's future is at the intersection between wireless and wired communication. The conclusion was clear, when a group of prominent people from Northern Jutland recently presented the report "Vision Northern Star" that has been under way for more than a year. The crisis in the IT and telecommunications sector has caused bruises after many years of uninterrupted success for Northern Jutland and a focus on the future of Northern Jutland's business. The past year's layoffs and the lack of development of third generation mobile telephones, UMTS, have not discouraged the enterprising forces in the area. Instead we should join forces for the next technological leap, 4G, which is expected to become a patchwork of wired protocols such as DSL and cable modem at some facilities and wireless technologies like Bluetooth, WLAN (Wireless Local Area Network) and Edge on others. But also the "technological shells" that the contents of these new converging technologies must function in, have great prospects, the report concludes."

"Forbindelsen til Nordjyllands fremtid skal findes i krydsfeltet mellem trådløs og kablet kommunikation. Konklusionen var klar, da en gruppe fremtrædende nordjyder for nylig fremlagde rapporten "Vision Nordstjernen", der har været mere end et år undervejs. Krisen i IT- og telesektoren har givet skrammer i mange års ubrudt fremgang for Nordjylland og sat

fokus på fremtiden for det nordjyske erhvervsliv. Det seneste års fyringer og manglende udviklingsopgaver til 3. generations mobiltelefoni, UMTS, har dog ikke taget modet fra de driftige kræfter i området. I stedet bør man samle kræfterne om det næste teknologispring, 4G, der forventes at blive et kludetæppe af kablede protokoller som ADSL og kabelmodem på nogle faciliteter og trådløse teknologier som Bluetooth, Wlan (Wireless Local Area Network) og Edge på andre. Men også de "teknologiske skaller", som indholdet til de nye konvergerende teknologier skal fungere i, rummer store perspektiver, konkluderer rapporten" (Krog 2002, p.10)

This is interesting because now the previous statement about engineering knowledge, which will save the day, has been replaced by a more detailed discussion about exactly the kind of engineering knowledge that will save the day. A discussion which "Vision Northern Star" (Vision Nordstjernen) is a contribution to, as it questions whether it is possible to develop such knowledge in Aalborg. The cluster got too little development work in UMTS to choose this as a future route, and therefore the idea of 4G is put forward. Let us therefore look at this report the reasons it was written, and the impact it had, in more detail.

8.7.6 The Nordstjerne report

The goal of this vision is to bring Northern Jutland to a position amongst the ten most known knowledge-based centres in Europe according to (Krog 2002), but money is needed to reach this goal. Here we see another reversal of a previous statement. We saw earlier a statement that current financial issues were not so important because the region had engineers with wanted knowledge. Now the situation is that money is needed in the region. It will, according to the article, take at least 200 million DKK to reach the goal within 5 years. 30 mill DKK is needed by the Center for PersonKommunikation every year, because this centre is running out of public funding. Another project, which is important "The Digital Northern Jutland – Northern Jutland as an experimentation" (Det Digitale Nordjylland – Nordjylland som eksperimentarium) is also in need of money, 80 million DKK in the period 2004-2006. The vision also contains an idea for a common secretariat, which also needs to be funded. The article then moves on to announce, that the NorCOM association has collected 1 million DKK from its members.

"Despite the many visionary thoughts, the group behind Vision Northern Star recognize, however, that the road to the European top-10 presents major challenges."... but the report does not contain more hot air than the visions actually can be realized in the coming decade. It will require a huge effort, but the region has in the past two or three decades demonstrated a special ability to "lift themselves by the hair ..." "they think. A huge task, not least, can be expected, of attracting several large companies with money and jobs in the aftermath. Although it carries risks. "The very large reduction of Ericsson's activities in Aalborg illustrates that the region is vulnerable to strategic changes and adjustments of foreign multinationals," the report says."

"De mange visionære tanker til trods erkender gruppen bag Vision Nordstjernen dog, at vejen mod den europæiske top-10 rummer store udfordringer. "... men rapporten indeholder ikke mere varm luft, end at visionerne faktisk kan realiseres i det kommende årti. Det vil kræve en kræft anstrengelse, men regionen har i de sidste to-tre årtier demonstreret en særlig evne til at kunne "løfte sig ved hårene..." mener de. Ikke mindst venter en stor opgave i at tiltrække flere store virksomheder med penge og arbejdspladser i kølvandet. Selv om det rummer en risiko. "Den meget kraftige beskæring af Ericssons aktiviteter i Aalborg illustrerer, at regionen er sårbar over for strategændringer og tilpasninger i de udenlandske multinationale selskaber", hedder det i rapporten" (Krog 2002, p.10)

The reasons why the Nordstjerne report emerged were twofold according to interviews. Firstly, it was because of the technological situation in the industry by the beginning of the 2000s. Jesper Jespersen thus explained, that at this time the companies had the GSM competence, and this

technology was maturing, and therefore the question emerged in the wireless environment: What is going to come after GSM?

"... So at some point they say, well, now GSM has been developed, and so there may be some additional facilities for GSM something called EDGE, and whatever else it is called, etc etc, it gets faster and faster, the network. But Northern Star was actually born to say, so what do we do after GSM. There was something that came to be known as DCS 1800, 1800 Mhz, and Aalborg totally missed it, more or less, development-wise. Somehow we missed the 3rd Generation, somehow. I would not say a 100 percent, but we missed it. And that was when Northern Star goes in and says, what the hell do we do now. Should we skip third Generation, and focus completely on 4th generation, and then together with Northern Star, but the group who wrote Northern Star, that it is also what we were saying, well, what is the claim we should go back to university with. What kinds of research and education, and what kinds of engineers and computer scientists and whatever, do we want to see? We would also like to see some Masters of technology degrees, we would like to see some MBAs, for example, is it possible to have an MBA education that can take the best of the engineers and give them a commercial side as well. So that you can take it further. These were some of the things that were in Northern Star if you see the report, right, as I recall, it has been a while since I read it. And so the university did that, but in the mean time the big boys grew, Ericsson with their own house out here, lots of people, Nokia with lots of people, and Nokia had to built the building up there called NOVI 6, it is their drawings that underpin it"

"... så på et tidspunkt siger de, jamen nu er GSM udviklet, og så kan der komme nogle yderligere faciliteter på GSM noget der hedder EDGE, og hvad det nu ellers hedder, osv osv, det bliver jo hurtigere og hurtigere netværket. Men, Nordstjernen blev jo egentlig født til at sige hvad gør vi så efter GSM. Der var jo noget der kom til at hedde DCS 1800, 1800 Mhz, og det missede Aalborg totalt, stort set, udviklingsmæssigt. Det gjorde man, på en eller anden måde missede man 3. Generation, på en eller anden måde. Jeg vil ikke sige 100 procent, men man missede den. Og det var så det Nordstjernen ligesom går ind og siger, hvad fanden gør vi. Skal vi springe 3. Generation over, og fokusere direkte på 4 generation, og så sammen med Nordstjernen, men den gruppe der sad og skrev Nordstjernen, der er det jo også vi siger, jamen, hvad er det så for nogle krav vi skal gå tilbage til universitetet med. Hvad er det for noget forskning og uddannelse, og hvad er det for nogle ingeniører og dataloger og hvad ved jeg, vi gerne vil se. Vi vil også gerne se nogle masters of technology, vi vil gerne se nogle MBA'er, f.eks., er det muligt at få lavet en MBA uddannelse, der kan tage de bedste af de ingeniører og give dem en kommerciel tilsnit også. Sådan at man kan tage det videre. Det var nogle af de ting der ligger i Nordstjernen hvis du ser rapporten, ikke, så vidt jeg husker, nu er det længe siden jeg har læst den. Og det gjorde universitetet jo så, Men i mellemtiden der voksede de store drenge, Ericsson med deres eget hus herude, masser af mennesker, Nokia med masser af mennesker, og Nokia skulle jo have bygget den bygning deroppe der hedder NOVI 6, det er jo deres tegninger der ligger til grund for det" (Jespersen 2010)

Niels Christian Gjerrild also recalled this phase, and especially a number of constructive discussions about where to go:

"... It was, I remember some very constructive discussions, which had many different aspects, luckily we fully agree that it was just the thing to do. Well, some very fruitful discussions and understood, in the sense that you could contribute with many different viewpoints, and then find each other, well, that's how we do it here.

"... det der var, jeg kan huske nogle meget konstruktive diskussioner, som heldigvis havde mange forskellige aspekter, heldigvis var vi ikke bare rørende enige om at det er bare lige det her vi skal gøre. Altså sådan nogle meget frugtbare diskussioner og forstået på den måde at man kunne bidrage med mange forskellige synspunkter, og så finde hinanden i, nå men det er sådan her vi skal gøre." (Gjerrild 2010)

In this regard the vision was an attempt to chart a course for the future technological development in the cluster, i.e. what direction is most promising for the industry? The Vision can however also be understood as a political statement. Jørgen Hedevang thus elaborated upon the role of the Nordstjerne Report, which was, as he recalled both a report on where to go, as well as a political statement. A political statement levelled at politicians to wave a flag and say that the industry is successful and deserves attention, and a political statement in relation to some environments at the university and in the municipality and county saying that the NorCOM association can take care of itself and deserves its place as the success story it is:

".. The [vision] was clearly an attempt, an initiative to highlight the industry's ability and power. And pointing out to the politicians some interest and investment fields, research, etc. So, give us, be vigilant, be aware that there is an industry here that constantly requires, that can contribute itself, but it also requires, it must be nursed and further developed, and there are some different scenarios. It is such a commentary on it. And then it's probably also worth mentioning NorCOM that organization as an association, it did at times live a hard life compared to those at the university, some of the currents at the university, not exactly Center for Personal Communications and Institute 8, but other places at the university where they would have preferred that NorCOM had been embedded, like other networks in some kind of meta-structure. And they were a little more with, how to say it, in what the industry could do. So, I will probably, allow me to say, that there was a bit, there was also efforts made by the county, at least the county and more officially from the top of the university about having an IT organization, which was unique, and also included the mobile phone industry. But the mobile industry did not want to go into the models, that were there at the time.

... Now you asked how I could put it in context. And that I can do. Putting it in context, because I think it will, it might be an over-interpretation on my part, it might be, some people will say it is, but I would say that it was, it was what it is, appears as an clarification of the technology and where it is going. It is quite customary, but you could say the timing and the choice to write a report that was of a fairly large professional scope, etc. it was also a comment on the second issue. And that went on for a number of years, some people really wanted NorCOM to, so to say, give up its independence and become a part of the overall IT under the IK and T name. Information and communication. And it has become that now. One can say that now it was it happened in one, i.e. the merger process is done now, or was done, it is probably a few years since we split ... "

"... Den [Visionen] var helt klart et forsøg, et tiltag om at markere industriens muligheder og power. Og pege på for politikerne nogle interesse og investeringsfelter forskningsmæssig osv. Altså, give os, være agtpågivende, være opmærksom på at der er en industri her som hele tiden kræver, den kan noget selv, men den kræver også, altså det skal også nurses og videreudvikles, og der er nogle forskellige scenarier. Det er sådan en kommentar til det. Og så er det vel også på sin plads at give en anden kommentar om at NorCOM, som organisation, som forening, den levede i perioder et lidt svært liv i forhold til de universitære, nogle af strømningerne på universitetet, ikke lige center for personkommunikation, og institut 8, men andre steder hvor universitetet så måske helst at den der NorCOM ting var indlejret ligesom andre netværk i noget meta struktur. Og at man havde, var lidt mere med, hvad skal man sige, i hvad industrien kunne finde på. Altså, det vil jeg nok tillade mig at sige, at der var sådan lidt en, der var jo også bestræbelserne fra amt, i hvert fald amtslig side, og universitets mere officiel overordnede side, om at have en it organisering, som var unik, og også omfattede mobil industrien. Men mobilindustrien var ikke sindet at gå ind i de modeller der ligesom lå på det der tidspunkt...

... Nu spurgte du om hvordan jeg kunne sætte den i kontekst. Og det kan jeg godt. Sætte den i den kontekst, for jeg tror det vil, det kan så være en overfortolkning fra min side, det kan man, det vil nogle nok sige, det, men jeg vil mene at den var et, den var det den er, fremstår som en udredning af teknologi og hvor går det hen. Det er helt regulært, men man kan sige, timingen og valget af at det blev en rapport af det der pænt store professionelle omfang osv.

Det var også et indspil i den anden problemstilling. Og det stod jo på en del år, at der er nogle der rigtigt gerne vil have at NorCOM så og sige opgav sin selvstændighed, og blev en del af det samlede IT under IK og T betegnelsen. Information og kommunikation. Det er det så også blevet nu. Man kan sige, at nu blev det det på en, altså den sammenslutningsproces der er lavet nu, eller blev lavet for, det er vel efterhånden et par år siden vi inddelte... ” (Hedevang 2010)

As part of a political game, the report was received well by the industry, but critically by some other people, especially people from the municipality, the county and specific parts of the university. Jesper Jespersen explained:

”Jespersen: Well, Northern Star was received very positive by the industry, that they wanted to do this. There were some political attempts that tried to stifle Northern Star

Reinau: Ok, can you elaborate a little

Jespersen: local politics, well, also university politics, relationships, and local politics, they thought it was completely stupid that we had written it. I got a good thrashing from my chairman at the time, because of what we had written it.

Reinau: Ok, why was that

Jespersen: Well it was contrary to the approach they would like in Northern Jutland, etc etc, then I say,

Reinau: What would they have instead

Jespersen: What is it that is in conflict with it, it is, yes, well I cannot remember but it was a completely wrong approach in their view. But now they use it themselves as a reference and say well, it was what turned the system up here at some point, right. That we still have a lot of developers, right. I believe that Northern Star was right, that we could not continue to produce in Northern Jut-land. That was probably what hurt the politicians, right, that they could not see it

Reinau: That Flextronics’ death was necessary

Jespersen: That Flextronics, Cetelco and whatever they were called down in Støvring back then, Hagenuk, that they would die. I think they could see. And we wrote that too. They could not maintain a production of the same magnitude as they could earlier because of competition from overseas markets, too. And it was true. And it also proved that it could not be done, right. Flextronics moved, yes, when Flextronics moved production up there, the production they had from Siemens, right, well, they moved it because by moving it to Hungary they could save two euros per unit produced. When you look at the overall picture, because wages, there are no wages in mobile phones. I think when Flextronics moved out of Pandrup, I think it was about 6% of production cost that was salary. It was not assembled by hand anymore, it was automatic to an extent that no hands were used. And if you move the same machines to Hungary, then there is also only 6% of salaries in the mobile phones coming out, but the logistics are, of course, were obviously cheaper, it was easier to move things in and out. That was the reason that they moved and that is Flextronics in a nutshell, they move to where they can produce things as cheaply as possible, right.

”Jespersen: Jamen, Nordstjernen blev jo medtaget meget positivt, i industrien, at man ville gøre det her. Der var nogle politiske tiltag der prøvede på at kvæle Nordstjernen,

Reinau: Ok kan du uddybe det lidt

Jespersen: lokalpolitiske, jamen også universitetets politiske, forhold, og lokalpolitiske forhold, de syntes det var helt åndssvagt vi havde skrevet den. Jeg fik så mange høvl af min daværende bestyrelsesformand, over at vi havde skrevet den der.

Reinau: Ok, hvorfor det

Jespersen: Jamen det var i strid med den strategi man gerne ville have i Nordjylland, osv osv, så siger jeg,

Reinau: Hvad ville man have i stedet for

Jespersen: Hvad er det der er i sted med det ikke, det er, ja det kan jeg så ikke huske, men det var helt galt grebet an efter deres opfattelse. Men nu bruger de den jo selv som reference og siger jamen det var det der vendte systemet heroppe på et tidspunkt ikke også. Til at vi stadigvæk har en masse udviklingsfolk ikke. Jeg tror at Nordstjernen så det rigtigt at, så at man ikke kunne blive ved med at producere i Nordjylland. Det var nok det der gjorde ondt på politikkerne ikke, at de kunne se.

Reinau: At Flextronics død den var nødvendigt

Jespersen: At Flextronics, Cetelco og hvad de nu hed nede i Støvring dengang, Hagenuk, at de ville dø. Det tror jeg de kunne se. Og det skrev vi også. At man kunne ikke opretholde en produktion i det omfang som man kunne tidligere pga. konkurrence fra de oversøiske markeder, ikke også. Og det var jo rigtigt. Og det viste sig også at det kunne ikke lade sig gøre vel. Flextronics flyttede jo, dengang Flextronics flyttede produktionen deroppe, altså den produktion de havde fra Siemens ikke, jamen de flyttede den jo fordi at ved at flytte den til Ungarn kunne man spare to euro pr produceret enhed. Når man tog totalbilledet, fordi lønningerne, der er ingen løn i mobiltelefoner. Jeg tror da Flextronics flyttede ud af Pandrup, der tror jeg det var ca. 6% af produktionsprisen, det var løn. Det var ikke samlet i hånden mere, det var automatiseret i et omfang så der ingen hænder var i det. Og hvis man flytter de samme maskiner til Ungarn så er der også kun 6% lønninger i telefonerne der kommer ud, men logistikken er jo, var jo åbenbart billigere, det var lettere at køre tingene ind og ud. Det var årsagen til at man flyttede og det er jo Flextronics i en nøddeskal, de flytter derhen hvor de kan producere tingene billigst muligt ikke. " (Jespersen 2010)

We here see the link to the Flextronics situation surrounding. We saw earlier in the section about Dancall and Flextronics that the closure of Flextronics hit the region hard as a large number of people was fired.

What was the impact of the Vision? Judging from the interviews and other available sources, the direct effect on the technological trajectories of the companies in the NorCOM cluster was limited. The reason for this was that the small local companies did not have the resources to pursue the discussed new directions and the larger MNC subsidiaries were relatively unable to pursue the new directions because of their relationship to headquarters. Niels Christian Gjerrild used the metaphor that one thing is to understand a maritime map, another is to steer a ship, and he explained it the following way:

"... Well, one can sit and totally agree that this is what we need. But, as small business, a small local company where funds are modest, there are no resources to actually even if you understand the charts, then actually getting the ship led in that direction. And in the big MNC-owned, where you perhaps have the means, well, they have no access to those funds, they are not allowed to go in that direction because that is; You must go 37 degrees east, that is it, that is the competence we have hired you for, and so you cannot suddenly start going west. So I think that is how the major companies have one type of challenges and small ones have a different type of challenge that actually have the same result. Not actually being able to act. Although you can certainly agree on what could, what ought to be do, I think that was at least some of it"

“... jamen, man kan godt sidde og være vældige enige om at det er det her vi skal. Men, som lille firma, lille lokal firma, hvor midlerne er beskedne, der har man ikke ressourcerne til rent faktisk også, selv om man har forstået søkortet, og så rent faktisk at få skibet ført den vej. Og i de store MNC ejede, hvor man måske nok har midlerne, jamen der har man ikke adgang til dem, der har man ikke lov til at gå i den retning, fordi det er altså, i skal gå 37 grader øst, det er det, det er den kompetence vi har hyret jer til, og så skal i ikke lige pludselig begynde at gå vest. Så jeg tror det er sådan, det, de store har en type udfordringer og de små har en anden type udfordringer, som i virkeligheden mønter ud i det samme. At man ikke sådan rigtig kunne handle. Selv om man godt nok var enige om hvad man kunne, hvad man burde gøre, jeg tror det var i hvert fald noget af det.” (Gjerrild 2010)

In articles emerging the following weeks, (Mathiessen 2002a;Mathiessen 2002b) and (Dalum 2002), dealing with “Vision Nordstjernen”, it is discussed whether there is basis for a cluster in the Printed Circuit Board industry in the region, and whether or not the idea of a medico cluster is hot air.

Two months later the situation in the cluster has moved even further away from the earlier fairytale story, which is shown in the headline “Impuls: Technology shift – a fight for survival” (Impuls: Teknologiskift – en kamp på liv og død) in Ingeniøren the 14th of June 2002 (Hansen 2002). The story is that it is necessary to choose the right technologies in the future:

“The faint outlines of a future where the traditional balance of power can be turned upside down, when it comes to investing in the right technologies - and being at the forefront of them. The rapid development in wireless technologies makes it necessary to work purposefully with research and development in order to succeed in the industry.”

“Man kan således ane konturerne af en fremtid, hvor der kan blive vendt op og ned på traditionelle styrkeforhold, hvor det gælder om at satse på de rigtige teknologier – og være med i front med dem. Den hastige udvikling indenfor de trådløse teknologier gør det nødvendigt at arbejde målbevidst med forskning og udvikling for at kunne begå sig i branchen.” (Hansen 2002, p.14)

The article tells the story of the different generations of phones in the cluster. The story according to the article is that the development in the telecom industry in Northern Jutland gained momentum in the 1980s. In the 1980s the industry was focusing on the first generation of phones (1G), the NMT phones. Two companies, Dancall and Cetelco, experienced huge success selling these phones, according to the article. The jump to the digital technology, GSM, 2G, was a huge leap. This passage to the global second generation of phones, GSM phones, or 2G, in the late 80s was a major leap, and Dancall and Cetelco formed a joint-venture DC-Development to create the basic technology. And the article draws a picture of a joint-venture project that did not perform very well:

“GSM could have been the beginning of a prosperous period for the two companies, but instead it was the end for the two independent companies. Partly because the competition for GSM was significantly harder than what, we had seen, for the NMT. At the same time, the form cooperation took made it harder to optimize the overall design and it significantly contributed to how the products very quickly became too expensive, too big and too heavy compared to competitors”

“GSM kunne være blevet starten på en fremgangsrig periode for de to firmaer, men i stedet blev det til de to selvstændige virksomheders endeligt. Blandt andet fordi konkurrencen på GSM var væsentligt hårdere end det, man havde set på NMT. Samtidigt gjorde samarbejdsformen det sværere at optimere det totale design, og det var stærkt medvirkende til, at produkterne ret hurtigt blev for dyre, for store og for tung i forhold til konkurrenternes.” (Hansen 2002, p.14)

So according to the article, Dancall and Cetelco had the opportunity to compete with the big players, but they did not succeed. Note also, that here the quality of the engineering work is presented as not good enough: the total design was not optimal; the products were too big, too heavy and too expensive. This is in contrast to earlier article, in which the competences of the engineers in the cluster were presented as being among the best. One can also frame it this way; in earlier articles we saw the statement that because NorCOM companies had very skilled engineers, they would survive and financial issues were not that important. Now we see this statement articulated again, but in a different form: the article argues, that the competences of Dancall and Cetelco were not good enough, their products being too large etc. However, the article presents the outcome as a success story anyway, because, although Dancall and Cetelco lost their independence the work of DC Development is presented as something which lifted the region in the future:

"Although the focus on GSM was not a long-term success for the two companies, it nevertheless contributed a technology boost for the whole region. Dancall's and Cetelco's efforts have led to the establishment of numerous GSM companies"

"Selvom satsningen på GSM ikke blev en langsigtet succes for de to virksomheder, bidrog den dog til et teknologiløft for hele regionen. Dancall og Cetelcos satsning har således givet anledning til etablering af en lang række firmaer inden for GSM." (Hansen 2002, p.14)

This is in line with the statement we saw earlier, i.e. that financial success is not important, what it important are the engineers and their ideas. These will stimulate the formation of new companies, attract foreign companies, and hence keep the cluster alive. The statement that the relationship between the industry and research at AAU, especially at Center for PersonKommunikation, is important is also rearticulated in the article. The article also presents some details about the threats that technological changes pose for the companies in the cluster. The first one is an issue of integration:

"Today, the GSM development is greatly facilitated by the advent of highly integrated chipsets, the design consists of substantially fewer components than previously. The integration of components has led to a change of skills needed in the region. This development poses a risk that the core know-ledge of technology is no longer maintained, but moved to specialist software houses and semiconductor suppliers. In the long run this might result in that the region can only work on de-sign at a level, that can be made just as well and significantly cheaper elsewhere, for example, in the Fareast"

"I dag er GSM-udvikling blevet betydeligt nemmere ved fremkomsten af højt integrerede chipsæt, sådan at designet består af væsentligt færre komponenter end tidligere. Integrationen af komponenter har ført til en ændring af kompetencebehovene i regionen. Udviklingen rummer en fare for, at kerneviden omkring teknologien ikke længere vedligeholdes, men derimod flytter til specialiserede softwarehuse og halvlederleverandører. På længere sign kan det resultere i, at man i regionen arbejder med design på et niveau, som lige så godt- og væsentligt billigere – kunne laves i for eksempel Fjernøsten" (Hansen 2002, p.14)

The article then explains that the change to 3G and 4G poses a number of challenges and possibilities for the companies in the cluster. In the discussion of possible answers to these it turns to the "Vision Nordstjernen" and its recommendations, which are: keep the knowledge lead, focus on knowledge environments within health technology, software development and IT service and coordinate these to gain a positive synergy effect, and use the relationship between university research and industry:

"... The university's plans to open a new Centre for Telecommunications Infrastructure", the CTIF are also included as a part of Vision Northern Star. From NorCom's side, we can only urge that the CTIF receives the necessary support so that the plans can be realized. It would

give the area a technology boost that can bring the ICT sector into a continued positive development - to benefit the region and the rest of the country. Throughout this process, there will unfortunately be companies that will have to close. Other companies will likely be closed by the foreign owners, and some companies will be sold. In return, some companies will come out stronger from the process, and new companies will emerge as spin-offs from the existing ones - with new, sustainable ideas as a starting basis.

“... Universitetets planer om at åbne et nyt Center for Teleinfrastruktur”, CTIF, indgår også som et element i Vision Nordstjernen. Fra Norcoms side kan vi kun opfordre til, at CTIF får den nødvendige opbakning, således at planerne kan føres ud i livet. Det vil kunne give området et teknologiløft, der kan bringe IKT sektoren ind i fortsat positiv udvikling - til gavn for regionen og resten af landet. I hele denne proces vil der nok desværre være firmaer, som må lukke. Andre virksomheder vil formodentlig blive lukket af de udenlandske ejere, og nogle firmaer vil blive solgt. Til gengæld vil nogle virksomheder gå styrket ud af processen, og nye firmaer vil opstå som spin-off fra de eksisterende – med nye, bæredygtige ideer som startgrundlag.” (Hansen 2002, p.14)

The statement made in this is thus in line with earlier statements; yes, there are challenges ahead, and yes, some companies will close, and others will be acquired by foreign capital, but financial success is secondary to the process in which knowledge is created; as long as the right knowledge is in the cluster, then new sustainable companies will emerge, and the cluster will prevail.

This statement, that it is the engineers and their knowledge which are the key to the cluster, and that commercial failures are secondary, is sustained in a subsequent article approximately two months later, with the title “Tele-engineers find new jobs in Northern Jutland” (Tele-ingeniører finder nye job i Nordjylland), with the sub title “Despite mass lay-offs in the mobile industry few developers have left Northern Jutland” (Trods masseafskedigelse i mobilsektoren er kun få udviklere flyttet fra Nordjylland) in Ingeniøren the 2nd of August 2002 (Pedersen 2002). In this article we see, that the lay-offs have spread from the production workers at Flextronics, and now includes engineers also. 285 developers in the companies in Northern Jutland have lost their jobs in the last year and three months. According to a qualitative study of 37 out of 40 companies representing the NorCOM cluster, by COWI, a Danish consultant company, almost all of the 285 developers have found new jobs in the same industry in the same region. The 37 companies employ approximately 3.000 people according to the survey, including approximately 1.100 developers. Of these are more than half engineers, the rest are computer scientists and information technologists. Given that they stay in the region the massive lay-offs are presented, not as a catastrophe, but as an avoided catastrophe, because the engineers stay in the region:

“Ole Marqweis who is the chairman of the IDA's [labour union for engineers] Labour market committee denotes the report's findings as surprising: If the developers, who were laid off, had left Northern Jutland it would have been a disaster for the province, because it would have been almost impossible to recreate that knowledge. Now the disaster failed to materialize, and that is well done by Northern Jutland. I did not think it was possible to retain that workforce”

“Ole Marqweis, der er formand for IDAs arbejdsmarkedsudvalg betegner rapportens konklusioner som overraskende: Hvis de udviklere, som blev afskediget, var rejst bort fra Nordjylland ville det have været en katastrofe for landsdelen, fordi det næsten ville have været umuligt at genskabe den viden. Nu er katastrofen udeblevet, og det er godt gået af Nordjylland. Jeg troede ikke, det kunne lade sig gøre at holde på den arbejdskraft” (Pedersen 2002, p.2)

This statement exists in a functional relationship to the one just discussed above, i.e. that the knowledge in the engineers in the cluster is the key to the survival of the cluster, not commercial success among the companies in the cluster. As long as the engineers and their knowledge stay

in the region, the cluster will survive. Therefore the lay-offs are not a catastrophe, because the engineers stayed. The article thus literally states that Northern Jutland has done well, which is interesting in the context of the mass layoffs reported. But this statement is possible in this article, only because of its functional relationship to the other statements in earlier articles, which separates discourses about the engineers and their knowledge from discourses about commercial success. Later in the article it is underscored, however, that the cluster is at a cross-roads:

"The study includes swimming three quarters of recession in the industry and two quarters before the IT downturn accelerated last summer. Therefore, this report could draw a too positive picture of the current situation, write the report's authors. For the same reason they dare not predict the future of the sector. According to the report the telecommunications industry in Northern Jutland are at a watershed where hopes of renewed growth are associated with an increased demand for traditional mobile phones, or that companies can get in on the next development generation in communication"

"Undersøgelsen omfatter både tre kvartaler med lavkonjunktur i branchen og to kvartaler, inden IT-nedturen tog fart sidste sommer. Derfor kan rapporten tegne et for positivt billede af den nuværende situation, skriver rapportens forfattere. Af samme grund tør de heller ikke spå om sektorens fremtid. Ifølge rapporten befinder den nordjyske teleindustri sig i et vade-
sted, hvor håbet om fornyet vækst knytter sig til, at der igen kommer gang i efterspørgslen indenfor traditionel mobiltelefoni, eller at virksomhederne kan komme med på næste udviklingsbølge inden for kommunikation" (Pedersen 2002, p.2)

So again the question is diverted to an issue of what type of knowledge the engineers should have, i.e. whether the companies can join in on the next generation of development and how the market develops.

The issue of mobility among the workers in the region is also discussed in the article. It has primarily been the larger companies which have fired people and these employees have then moved to smaller companies in the region. Many of the smaller companies which have employed people have therefore traded less qualified workers for more experienced workers from larger companies. This means that the undergrowth of small companies has been strengthened due to the lay-offs because previously these companies did not have the possibility of hiring experienced workers due to cost and availability.

Computerworld announces in an article the 9th of Marts 2003 that a new university centre, which shall function as the national epicentre to restart the growth in the telecom industry, is getting underway (Troelstrup 2003). Center for Teleinfrastruktur will open the following month, and it will mainly be placed in Aalborg, at Aalborg University, but a part of the approximately 150 researches attached to CTIF will be placed at other locations in the country, for example at DTU in Lyngby. The idea is that CETIF will replace CPK, which was closed at the beginning of the year as its funding ran out, and it will have a broader focus. Where CPK had been the epicentre of the development of the environment of mobile companies in Northern Jutland, with a focus on wireless technologies, CTIF is going to focus on the convergence between wired and wireless technologies.

In May of 2004 we see a new view of the situation in Northern Jutland, under the heading "Mobile phones not generating jobs" (Mobiltelefoner ikke jobgenerator) in Erhvervsbladet:

"It has been almost four years since the American group Flextronics took over Bosch Telecom's new production facilities in Pandrup and announced that until the end of 2003 they should deliver 33 million mobile phones to Siemens for several billion DKK. The factory employed 1,700 employees in its golden age. Today the Pandrup-company's CEO, Peter Hinrup, is fighting a fierce battle against the clock to find investors who will help to save the pieces of

the production. Siemens did not put in another order in Pandrup and Flextronics pulled out. With a little Northern Jutlandish luck they will manage to save 350 jobs, but it does not change the fact that the industry no longer looks like something of a job generator".

"Det er nu knap fire år siden den amerikanske koncern Flextronics overtog Bosch Telecoms nye produktionsfaciliteter i Pandrup og bekendtgjorde, at man frem til udgangen af 2003 skulle levere 33 mio. mobiltelefoner til Siemens formedelst et større milliard beløb. 1.700 ansatte var fabrikken oppe på at beskæftige i storhedstiden. I dag kæmper Pandrup-virksomheden adm. direktør, Peter Hinrup, en hård kamp mod uret for at finde investorer, der vil være med til at redde stumperne af produktionen. Siemens afleverede ikke nogen genbestilling i Pandrup, og Flextronics trak sig ud. Med lidt nordjysk held vil det lykkes at redde 350 arbejdspladser, men det ændrer intet ved, at branchen ikke længere ligner noget jobgenerator". (Erhvervsbladet.dk 2004b, no page numbers)

It is also discussed in the article, how many new jobs the NorCOM cluster will create. According to Bent Dalum, it has not been studied what the impact of the NorCOM cluster is on suppliers. Another researcher from AAU, John Johansen, says that it is his feeling that not a lot of jobs are created in the industry anymore. The CEO of RTX Telecom A/S, Jørgen Elbæk, however, does not believe that it is possible to say that there are no Danish suppliers to the telecom industry, and that RTX Telecom A/S itself is partly a supplier company, and also uses suppliers.

A couple of months later, a new article is published with a more positive heading "A small forest of success stories in Northern Jutland" (En skov af små nordjyske solstrålehistorier) in Erhvervsbladet the 6th of July (Carstensen 2004). The story is that in the shadow of Flextronics, SMEs in the region are pulling employment in the right direction. The article looks at the region as a whole, not only the mobile telecommunications industry, but the message is repeated in another article around Christmas of the same year, with the heading "It is not all bad" (Det går ikke så ringe endda) (Troelstrup 2004). This article explains that it has been a tough year for the mobile industry in Northern Jutland. After Flextronics pulled out of the region, and a number of attempts to save some jobs had failed, the last of the employees was fired in June. And Maxon Telecom pulled out in 2004, which caused 102 people to lose their jobs, most were development engineers. Despite this, the situation is not all bad according to Bent Dalum from Aalborg University:

"Things are better than expected. Deducting the 1,700 manufacturing jobs that have been lost with Flextronics from the 4,300 who were employed in the sector, when it was at its peak, would mean that we today have 2,600 employees in the sector. But currently there are 2,825 employed in the 45 companies that are members of the cluster association NorCOM. And additionally, more jobs must be counted as part of the sector, that are not part of NorCOM, says Associate Professor Bent Dalum, Department of Business Studies at Aalborg University who has followed companies in this area closely."

"Det går bedre end forventet. Trækker man de 1.700 produktionsarbejdspladser, der er gået tabt med Flextronics fra de 4.300 der var beskæftiget i sektoren, da den var på sit højeste, skulle vi i dag have 2.600 beskæftigede i sektoren. Men der er i øjeblikket ansat 2.825 i de 45 virksomheder, der er medlemmer af cluster-sammenslutningen NorCOM. Og hertil kommer flere arbejdspladser, der må regnes til sektoren, men som står udenfor NorCOM, siger lektor Bent Dalum fra Institut for Erhvervsstudier ved Aalborg Universitet, der har fulgt virksomhederne på dette område nøje" (Troelstrup 2004, p.68)

Therefore, the argument in the article is that although it is sad that a number of production workers have lost their jobs, a number of development jobs has been created. A tendency mentioned to be normal in high-wage areas, such as Northern Jutland. The data shows, however, also that despite this growth of the number of development jobs, more and more engineers are becoming unemployed. In the spring, before a new group of engineers graduates from univer-

sity, the number of unemployed engineers in the region has climbed from around 100 to around 250 from 2002 to 2004, however, most of these are architecture and design engineers. The rising number of development jobs is interpreted as a sign that the mobile sector in Northern Jutland is changing in character, and Bent Dalum argues:

"In the late 80s and early 90s it was predominately the development of GSM, which created new development jobs in the area. 3G has not been the same driving force. Today's activities are more diversified in the mobile field, people are working in radio technologies and applications, in addition to working with maritime and satellite communication and other wireless technologies. It provides better shock absorption capability, when one of the areas is hit by a crisis, says Bent Dalum"

"I slutningen af 80'erne og begyndelsen af 90'erne var det i høj grad udviklingen af GSM, der skabte nye udviklingsarbejdspladser i området. 3G har ikke været denne samme drivkraft. I dag er aktiviteterne mere differentierede indenfor mobilområdet, hvor der både arbejdes med radioteknologier og applikationer, herudover arbejdes der med maritim og satellitkommunikation og andre trådløse teknologier. Det giver en bedre chockabsorptionseve, når et af områderne rammes af krise, siger Bent Dalum." (Troelstrup 2004, p.68)

Here we see a new statement emerging, now the region is broader in its palette of competences. We saw earlier a statement that engineers in Northern Jutland were valuable due to their knowledge, and that this knowledge would make the cluster survive. This was followed by a discussion about what competences the engineers should have, and if they should choose the 3G track or the 4G track, and what was 4G? Now we see the argument, that what makes the cluster resilient is the diversity in the technologies employed, which is seen in the following quote:

"This means that it is possible to recruit people with a wide range of experience in the area, and this access to a wide range of skills is one of the main motives for the companies that have expanded their R&D departments in Northern Jutland"

"Det betyder, at det er muligt at rekruttere folk med en bred vifte af erfaringer i området, og denne adgang til brede kompetencer er et af de vigtigste motiver for de virksomheder, der har udvidet deres udviklingsafdelinger i Nordjylland" (Troelstrup 2004, p.68)

The article presents two cases, Texas Instruments Denmark and Gatehouse:

"Texas Instruments, the world's leading manufacturer of chips for mobile phones, established itself in the area eight years ago with three men and now has a development department with 157 employees. - In Aalborg we make so-called reference design for mobile phones, which includes a development platform for the whole mobile phone. It requires broader skills in all the disciplines required to develop a cell phone, besides making the basic chip. In this area we can find, among other things, project managers who can grasp the whole [process]. Therefore, we develop our department here, said director Kim Breum-Christensen from Texas Instruments"

"Texas Instruments, som er verdens forende producent af chip til mobiltelefoner, etablerede sig i området for otte år siden med tre mand og har nu en udviklingsafdeling med 157 ansatte. - I Aalborg laver vi såkaldte referencedesign til mobiltelefoner, som omfatter en udviklingsplatform til hele mobiltelefonen. Det kræver bredere kompetencer i alle de discipliner, der skal til for at udvikle en mobiltelefon, ud over at lave den grundlæggende chip. Her i området kan vi blandt andet finde projektledere, der kan overskue helheden. Derfor udvikler vi vores afdeling her, siger direktør Kim Breum-Christensen fra Texas Instruments" (Troelstrup 2004, p.68)

It is not factually correct that Texas Instruments started with 3 employees, when they acquired the local company ATL Research there were already a number of employees in the company, as

the TIDK story explained. Important to note here, is the focus on the broad competences, TIDK does not only possess the specific competence to develop a specific component; they possess the broad competences needed for reference designs, as the CEO argues. In the discussion about Gatehouse, the article contains a new important statement, the need for skills different from engineering skills:

"- Here you can get the right people. The university has over the last 30 years built excellent skills, says Niels Buus from Gatehouse. The company develops software and protocols for maritime and satellite communication, among other things, for the Maritime Safety Administration, and last year it reached 50 employees. Niels Buus however, believes that the university can enhance the area even more by adding business skills to the technical disciplines. - if we spend a few years reforming education, so that educate engineers dare to becoming business people, the area will have an even greater potential, he says

" - Her kan du få de rette folk. Universitetet har gennem de sidste 30 år bygget fantastiske kompetencer op, siger direktør Niels Buus fra Gatehouse. Selskabet udvikler software og protokoller til maritim og satellitkommunikation blandt andet til Farvandsvæsnet, og det er gennem det sidste år nået op på at beskæftige 50 mennesker. Niels Buus mener dog, at universitetet kan styrke området endnu mere ved at tilføje købmandskab til de tekniske discipliner. - Bruger vi nogle år på at omlægge uddannelserne, så vi uddanner ingeniører, der tør blive forretningsfolk, vil området have et endnu større potentiale, siger han. " (Troelstrup 2004, p.68)

This is a new statement: business talent is needed in addition to engineering skills. We saw earlier the statement, that engineering knowledge was the key to success, and only engineering knowledge, for example the CEO quoted above who took pride in the fact that himself and his secretary were the only two people in his company not doing engineering work. The statement that the university with its specific profile is important is rearticulated too:

"- It is important that the people we recruit here, already at the university has learned to work project-oriented and cooperating with others. We have 22 nationalities here in Nørresundby, and the employees here are working closely with groups from Siemens' nine other development centers around the world, says Flemming Eriksen from Siemens. "

"- Det er vigtigt, at de folk, vi rekrutterer her, allerede på universitetet har lært at arbejde projektorienteret og at arbejde sammen med andre. Vi er 22 nationaliteter her i Nørresundby, og medarbejderne her arbejder tæt sammen med folk fra Siemens' ni andre udviklingscentre rundt om i verden, siger direktør Flemming Eriksen fra Siemens." (Troelstrup 2004, p.68)

And the fact that the competences in the region are getting broader, is linked directly to initiatives at the university, where the number of specializations in the master's programmes within the electronics areas has grown during the previous 6-8 years, so that there is currently 18 different master programmes.

Approximately 11 months later, the chairman of NorCOM, Niels Buus writes in an article in Nordjyske, that there is a lot of potential in the industry, which through a concentrated effort would be able to support development in Northern Jutland. His point is that the industry is doing well, because despite some closures, there are now more technicians and salaried employees employed in the industry than ever before.

"The lesson seems to be simple, there are still opportunities even in a very volatile and competitive world, if only you make sure to be at the forefront of the industry and company you are dealing with right now."

"Læren ser ud til at være den enkle, at der fortsat er muligheder også i en meget omskiftelig og konkurrencepræget verden, hvis bare man sørger for at være med helt fremme i den branche og virksomhed, man lige nu har med at gøre" (Buus 2005, no page number)

Again we see that the value of technical knowledge is emphasized:

"Without detracting from other important factors in the development, we can see that new and advanced knowledge in our area is a crucial factor for success. On the research and education side Aalborg University is vital and they are doing a great job with the continued development and establishment of new research units and international research collaborations."

"Uden at forklejne andre vigtige faktorer i den udvikling kan vi konstatere, at ny og avanceret viden indenfor vores område er en helt afgørende faktor for succes. På forsknings- og uddannelsessiden er Aalborg Universitet helt afgørende og gør et flot stykke arbejde med fortsat udvikling og etablering af nye forskningsenheder og international forskningssamarbejde" (Buus 2005, no page number)

The statement about the value of variation is also stressed in the article:

"If we look at the companies, we must say that this is a large and motley group, each with its core competencies. The interplay of these various competencies provides the necessary dynamics in the industry. Great variety and diversity in size, technology, customer base etc. makes it attractive to be a part of the industry."

"Ser vi på virksomhederne, må vi sige, at der er tale om en stor og broget flok med hver sine kernekompetencer. Samspillet af disse mange forskellige kompetencer giver den nødvendige dynamik i branchen. Stor variation og forskellighed i størrelse, teknologi, kundekreds mv. gør det attraktivt at være en del af branchen" (Buus 2005, no page number)

Niels Buus also explains, that the Ministry of Science is initiating a project to renew the framework conditions for the wireless industry in Denmark, under the heading "Technological foresight" (Teknologisk Fremsyn), and explains further, that the NorCOM association is planning to participate in this process to create the best possible industry in Northern Jutland, and in Denmark in general.

Another statement made in this article is also important, and that refers to the variety again. We saw earlier that the wireless industry in Northern Jutland was discussed as an industry which was successful on its own, but in this article the chairman of NorCOM discuss the benefits of cooperation between the wireless industry and the IT industry, which quote "...We[NorCOM] in many ways are closely related to..." (...vi [NorCOM] på mange områder er nært beslægtede med...) –(Buus 2005, no page number):

"The more the individual, naturally coherent industries stand together in their separate fields and work together to realize the underlying potentials, the more options all of us have to cooperate commercially and in terms of knowledge within the region"

"Jo mere de enkelte, naturligt sammenhængende brancher hver for sig på deres felter står sammen om at realisere de underliggende potentialer, jo flere muligheder har alle for at samarbejde kommercielt og videnskabsmæssigt indenfor regionen" (Buus 2005, no page number)

One of the places where Niels Buus sees room for cooperation is in the profiling of Northern Jutland, as a good place to live for people with the competences needed in the region.

In February of 2006 Computerworld Online brings the following short news story about the situation in Northern Jutland:

"It is going brilliantly for phone industry in Northern Jutland, which currently employs more technicians and permanent employees than ever before. So says the association NorCOM who has gathered most of the companies in Northern Jutland in wireless and mobile communications. Chairman Niels Buus also stated that there is great demand for workers from the closed telecommunication companies in Northern Jutland."

"Det går strålende for den nordjyske telefon-industri, der for tiden beskæftiger flere teknikere og funktionærer end nogensinde før. Det oplyser foreningen NorCOM, der samlet hovedparten af de nordjyske virksomheder indenfor trådløs og mobil kommunikation. Formand Niels Buus meddeler desuden, at der er stor efterspørgsel på medarbejdere fra lukkede televirksomheder i det nordjyske" (Jensen 2006)

Here we see that things have changed, the struggle for life which was in the headings a couple of years earlier has now been replaced with the argument that the cluster is doing better than ever. The success is also articulated in an article the following day, with the heading "Northern Jutland lacks IT-people" (Nordjylland mangler it-folk) by ComON (Pedersen 2006b). According to this article the number of engineer jobs in the wireless and mobile companies in Northern Jutland has grown from 2.800 to 3.000 within one year, and there are currently 50 jobs available, especially within software. The industry therefore fears, that this lack of specialists might slow future growth. The chairman for NorCOM, Niels Buus, is quoted in the article for saying, quote:

"Until now there has mostly been talk that it may take a long time to get positions filled, but at some point it is going to be a question of simply not being able to get the necessary staff."

"Indtil videre har der mest været tale om, at det kan tage lang tid at få stillinger besat, men på et tidspunkt slår det over i, at man ganske enkelt ikke kan få fat i de nødvendige medarbejdere" (Pedersen 2006bno page number)

The statement about network within the region is underscored again under the title "People in Northern Jutland focus on Network" (Nordjyder satser på netværk) in DI Business the 6th of Marts 2006 (DI Business 2006). The story in this article is, that the members of NorCOM are cooperating to improve their opportunities to join in on the European space program ARTES. According to NorCOM chairman Niels Buus, the corporation is valuable, because by joining forces the companies in the cluster can be promoted in more places, fairs and advertising companies, than if promotion was left to the individual companies. So what we see here is again the statement, that if NorCOM companies help each other, then they are stronger than if they are on their own. Furthermore, Niels Buus is quoted saying, that NorCOM makes an effort to attract engineers to the region, and make it attractive for new engineers to stay in the region. He also elaborates on the relationship between the NorCOM companies and the university. His point is that the network depends upon both the NorCOM companies and upon AAU. Therefore NorCOM makes an effort to attract researchers to the university, so that the region can maintain the high level of knowledge of wireless communication. NorCOM also supports Aalborg International School, so that foreign researchers can educate their children while they stay in the region.

The lack of engineers seems to intensify at the beginning of Marts 2006, because the 7th an article is brought with the heading "A lack of engineers costs job" (Mangel på ingeniører koster jobs) by Ritzaus Bureau (Ritzaus Bureau 2006). Here the story is that a number of companies within the mobile- and telecommunications industry in Northern Jutland have concrete plans of setting up sites outside of Northern Jutland, because they are short of engineers. Grimur Lund, CEO of Logimatic, is quoted saying:

"We have no plans to establish branches outside the country. But I can understand if someone else has it. It is a serious matter. The consequences may be that it hurts our business. And there are already emerging trends that people poach each other's employees."

"Vi har ikke planer om at etablere afdeling uden for landet. Men jeg kan godt forstå, hvis andre har det. Det er en alvorlig sag. Konsekvenserne kan blive, at det går ud over vores forretning. Og der er allerede spirende tendenser til, at man går på jagt efter hinandens medarbejdere" (Ritzaus Bureau 2006, no page number)

The same issue is the focus of another article the 8th of Marts, with the heading "Engineer shortage moves jobs abroad" "(ingeniørmangel flytter job til udlandet)" (Pedersen 2006a).

A positive view of the future of the Danish mobile telephone industry is presented in an article in Computerworld Online the 21st of April 2006 with the title "Danish Mobile Phone industry reach new heights" (Dansk mobilindustri på vej mod nye højder) (Computerworld Online 2006). In this article a number of experts argues, that there is a real possibility of a bright future for the Danish industry. Knud Erik Skouby, researcher at DTU argues that given the track record of well-functioning cooperation between Danish universities, public authorities and private companies; given the presence of research projects such as "Magnet Beyond", a 4G project between AAU and DTU; and given the vibrant environment in Northern Jutland around NorCOM and in Copenhagen around Nokia's development site, a potential for a bright future exists. Bent Dalum from Aalborg University argues in the article that a number of companies in the industry in Northern Jutland have grown significantly, and RTX Telecom and Gatehouse are mentioned as examples. In the discussion of what can be done to support the industry, telecom analyst John Strand points out, that the public authorities needs to change their view of the industry:

"If we want to create our own Nokia, we need some politicians with vision. The wind Industry is being carried by startup grants for alternative energy and tax credits, and agriculture is sustained by agricultural subsidies. But when it comes to the telecom industry, there is no industrial policy, although the telecom industry is larger than the wind industry - both in terms of the number of employees and the turnover. And there is also a much greater potential for growth in the tele-communication industry, said John Strand."

"Hvis vi skal kunne skabe vores eget Nokia, skal vi have nogle politikere med visioner. Vindmølleindustrien bliver holdt oppe af starttilskud til alternativ energi og skattefradrag, and landbruget bliver holdt oppe af landbrugsstøtten. Men når det kommer til teleindustrien, så er der ingen industripolitik, selvom teleindustrien er større end vindmølleindustrien - både hvad angår antal medarbejdere og i omsætning. Og der er samtidig et langt større vækstpotentiale i teleindustrien, siger John Strand" (Computerworld Online 2006, no page number)

The CEO of the industry community ITEK, Tom Togsverd is demanding, according to the article, more risk-willingness from the industry itself.

The synergy statement is articulated again in an article under the heading "Danish world-class research" (Dansk forskning i verdensklasse) the 26th of June 2006 (Severinsen 2006). An international evaluation report has placed Institut for Datalogi, at AAU, among the world's elite in the field. The dean of "The Faculty of Natural Science" (Det Naturvidenskabelig Fakultet) at AAU, Frede Blaabjerg argues, according to the article, that cooperation with business is necessary if the level is to be maintained, and Niels Buus, chairman of NorCOM argues, that the global competitiveness of the industry depends on such cooperation.

The lack of engineers is articulated again in Computerworld Online the 30th of June, under the heading "Northern Jutland is chasing mobile engineers on Zealand" (Nordjyder jagter sjællandske mobil-ingeniører) (Stensdal 2006b). According to this article a number of companies in the mobile industry in Northern Jutland have been forced to turn down orders, due to a lack of engineers with the right qualifications. The NorCOM association has therefore initiated a project to attract engineers from the Copenhagen area, and one estimate is that there is a need for around 50-60 engineers in the industry. The same issue is articulated in another article in Computerworld Online the 19th of July, with the heading "The Mobile industry thirst for new engineers" (Mobilindustrien tørster efter nye ingeniører) (Stensdal 2006a). Here the message is that companies are asking for engineers with masters in mobile communication. The article also touches on the different profiles of the degrees in Aalborg and Copenhagen. According to Knud Erik Skouby from DTU, the main difference is that students in Aalborg are focusing on the deep technology, for example development of antennas, while students in Copenhagen are focusing more on the application possibilities and development of new services. The lack of engineers is also articulated in Erhvervsbladet the 4th of October. Here the message is, that the shortage is the starting point for a project to get more young people to study IKT (Carstensen 2006).

The issue of attracting engineers is mentioned again in an article in Nordjyske Stiftstidende the 8th of Marts 2007 (Nordjyske Stiftstidende 2007). Here the message is that a number of companies from the wireless communication industry will host an event the same day, arranged by NorCOM, where they will present themselves to around 100 Danish and foreign engineering students. The companies are: SpaceCom, Progressive Media, Gatehouse, WirTek, Nokia, Rhode & Schwarz, RTX Telecom, AM3D, ETI, Motorola, Prevas and Texas Instruments.

The issue of what type of engineers the NorCOM companies need is articulated in an article by NorCOM chairman Niels Buus with the heading Debate: Strengthen breadth" (Debat: Styrk bredde) in Nordjyske Stiftstidende the 7th of April (Buus 2007). In the article Buus calls for a renewal of the engineering degrees so that they become broader and not only focused on technical engineering issues:

"Personally, I could dream about a reform, so that there was a much more fluid transition between the technical disciplines on the one hand and the managerial and commercial ones on the other hand."

"Personligt kunne jeg drømme om en reform, således at der kom en meget mere flydende overgang mellem de tekniske discipliner på den ene side og de ledelsesmæssige og kommercielle på den anden side." (Buus 2007, p.10)

The state of the industry in Northern Jutland is discussed again in an article in Computerworld Online the 26th of April under the heading "Development shall ensure Denmark's mobile position" (Udvikling skal sikre Danmarks mobil-position) (Stensdal 2007). The story is that the world is changing. China is no longer solely a production country, development work will also be done there in the future, which means that a new distribution of development activities will emerge globally, according to Bent Dalum. The article argues that there are 45 companies in Northern Jutland working within the mobile and wireless communication, and half of these are members of the NorCOM association. The role of these companies in the future division of labour is clear according to Bent Dalum:

"It is to develop handsets and chipsets. There is still much to develop the field of 2.75G (EDGE), HSPA and the entire antenna side, where we now have to play to many different standards. That is where we have our strengths," says Bent Dalum.

In addition to 3G development and development of antennas Bent Dalum points out that Bluetooth, mobile TV and game-development for mobile devices are specific areas where there is a need for the development companies."

"Det er at udvikle telefoner og chipsets. Der er stadig meget at udvikle inden for 2,75G (EDGE), HSPA og på hele antennesiden, hvor man nu skal kunne spille på mange forskellige standarder. Det er der, vi har styrker," siger Bent Dalum.

Foruden 3G-udvikling og udvikling af antenner peger Bent Dalum på, at Bluetooth, mobil-tv og spil-udvikling til mobile enheder er konkrete områder, hvor der er brug for udviklings-virksomheder." (Stensdal 2007, no page number)

The key to this is according to Dalum knowledge:

"It goes wrong the moment that the knowledge environment is in a rut, then something extraordinary is needed to get businesses to stay. As long as our good reputation is intact, we have a chance, but it's always a struggle - and the struggle will continue," says Bent Dalum.

"The key is that we must have enough active research environments that can produce graduates who are needed by the companies. That is why multinational companies invest funds in Denmark. They "plug into" so to speak, into a knowledge environment that is already in the area," explains Bent Dalum ..."

"Den er gal i det øjeblik, at vidensmiljøet sander til, for så skal der noget ekstraordinært til at få virksomhederne til at blive. Så længe vores gode renommé består, har vi en chance, men det er hele tiden en kamp - og den kamp vil fortsætte," siger Bent Dalum.

"Nøglen er, at vi skal have nogle tilstrækkelig aktive forskningsmiljøer, der kan producere de kandidater, som der er brug for ude i virksomhederne. Det er derfor, at multinationale virksomheder placerer afdelinger her i Danmark. De "plukker" så at sige ind i et vidensmiljø, der allerede er i området," forklarer Bent Dalum..." (Stensdal 2007, no page number)

The 7th of September 2007, Computerworld Online tells that a unified ICT-venture is underway in Northern Jutland:

"The two ICT networks Northern Jutland, IKT Forum and NorCOM has teamed up with the University of Aalborg, Region Northern Jutland and the Municipality of Aalborg in Northern Jutland to strengthen its position as a leading ICT region. "We have the framework to be a real winner-region in ICT: Over 10 percent of the workforce works in ICT. It happens in an industry that is growing quite significantly," said the Chairman of the IKT Forum, Grimur Lund, who is the CEO of Logimatic. The first ground for cooperation is broken at a meeting on Tuesday 18 September. "

"De to nordjyske IKT-netværk, IKT Forum og NorCOM er gået sammen med Aalborg Universitet, Region Nordjylland og Aalborg Kommune for at styrke Nordjyllands position som landets førende IKT-region. "Vi har alle rammerne til at være en rigtig vinder-region inden for IKT: Over 10 procent af arbejdsstyrken arbejder inden for IKT. Det sker i et erhverv, der vokser ganske markant," siger formand for IKT Forum, Grimur Lund, der til daglig er administrerende direktør i Logimatic. Først spadestik til samarbejdet tages på et møde tirsdag den 18. september." (Elkær 2007, no page number)

The same news is published in a number of different media the same day. The 21st of September it is announced in an article that AAU will be part of a university in South Korea (Brock 2007). AAU was chosen due to its status as a member of a consortium of 11 European universities. The article further explains that AAU already has research connections with South Korea through

cooperation with Samsung, who have invested 25 million DKK in a centre at Center for Teleinfrastruktur at AAU:

- In Seoul, Samsung confirmed that they have been very pleased with the cooperation so far and raised the prospect that they will focus a lot on us in the future, as the university which is most centrally located, when it comes to mobile communication. They will develop both design and technology in Denmark, and we will come to benefit from that, explains Finn Kjærdsdam."

"- I Seoul bekræftede Samsung, at de har været meget glade for samarbejdet indtil nu og stillede i udsigt, at de vil satse meget på os i fremtiden, som det universitet, der ligger mest centralt placeret, når det gælder mobil kommunikation. De vil udvikle både design og teknologi i Danmark, og det kommer vi til at nyde godt af, forklarer Finn Kjærdsdam." (Brock 2007, no page numbers)

The article further tells that Finn Kjærdsdam has been in South Korea with a delegation of representatives from NorCOM. This promotion work done by NorCOM is discussed further in Nordjyske.dk the following day under the heading "Wireless offensive in South Korea" (Trådløs offensiv i Sydkorea) (Bach 2007). Here the argument is that representatives from NorCOM and AAU are following Prime Minister Anders Fogh Rasmussen, who is on an official visit in South Korea. The objective is to make potential business partners in South Korea aware of the niche-knowledge in NorCOM:

"- Northern Jutland has niche knowledge in wireless communication, and that is what, we will bring into play with our South Korean partners, said Jørgen Hedevas, executive secretary of NorCOM."

"- Nordjylland har en nicheviden indenfor trådløs kommunikation, og det er den, vi vil bringe i spil over for vores sydkoreanske samarbejdspartnere, siger Jørgen Hedevas, sekretariatsleder i NorCOM" (Bach 2007, no page number)

8.8 The End of the NorCOM cluster

Almost one year later, the 26th of September 2008, the synergy between AAU and the IKT is again presented as something positive, in an article by Henning G. Jensen, the mayor of Aalborg, under the heading "ICT-Industry: Northern Jutland is a winner region" (IKT-Industri: Nordjylland en vinderregion) in Nordjyske.dk (Nordjyske.dk 2008). However, approximately two months later, the 21st of November, another article in Ingeniøren has a more bleak heading "State of the market: Closures threaten Aalborg's mobile cluster" (Konjukturer: Lukninger truer Aalborgs mobilklynge) (Sørensen 2008). The message in this article is that Texas Instruments in Aalborg has been put up for sale, Motorola in Aalborg is facing a closure and Infineon in Aalborg is in a dangerous situation, and the mobile industry in Northern Jutland in general is facing a crises which can threaten the whole cluster. According to Sven Vestergaard, the chairman for NorCOM a number of significant players in the industry in Northern Jutland is threatened. NorCOM is therefore already talking with AAU about starting continuing education for engineers. The development director, Morten Nielsen, from Texas Instruments Denmark A/S is quoted in the article saying:

" The industry has been squeezed since the summer of 2007. Sales figures are declining. People do not buy as many mobile phones as they did a year ago. In bad times the purchase of mobile phones is one of the first things consumers cut down on."

"Det har strammet til i branchen siden sommer 2007. Salgstallene er nedadgående. Folk køber ikke så mange mobiltelefoner som for et år siden. I dårlige tider er køb af mobiltelefoner noget af det, forbrugerne først skærer ned på" (Sørensen 2008, p.2-3)

The article also explains that despite these problems, some people in the cluster are still optimistic about the future:

""There is a need for the kind of development that we can do in the cluster in Northern Jutland "says NorCOM-President Sven Vestergaard. "We see that there are constantly new development houses emerging in the area. We have seen several times, that we have lost businesses, but others have appeared. It has happened every time we have experienced a crisis," says Sven Vestergaard."

«Der er et behov for den slags udvikling, som vi kan i det nordjyske cluster,« siger NorCOM-formand Sven Vestergaard. »Vi ser, at der også konstant kommer nye udviklingshuse til området. Vi har set flere gange, at vi har mistet virksomheder, men at andre er kommet til. Det er sket hver gang, vi har oplevet en krise,« siger Sven Vestergaard.» (Sørensen 2008, p.2-3)

We see here, that the downturn is explained as due to the declining sale of mobile phones, resulting from the financial crises. Another statement occurs in the beginning of December 2009, in the article "Technology: Mobile cluster in Northern Jutland face new turmoil" (TEKNOLOGI: Nordjysk mobilklynge foran nye omvæltninger) in Erhvervsbladet the 3rd of December (Carstensen 2008a). This article also states the fact that both Texas Instruments Denmark A/S and Motorola have been put up for sale, and that Sven Vestergaard, chairman of the NorCOM association maintains his optimistic view:

""At the moment great efforts are deployed to sell both Motorola's development company in Northern Jutland as well as Texas Division, and I am optimistic about the sales opportunities. The unique Northern Jutlandish competencies in mobile and wireless technology will also be needed in the future," he says."

«I øjeblikket udfoldes der store bestræbelser på at sælge såvel Motorolas nordjyske udviklingselskab som Texas division, og jeg ser da optimistisk på salgsmulighederne. De unikke nordjyske kompetencer inden for mobil og trådløs teknologi vil der også i fremtiden være brug for,« siger han.» (Carstensen 2008a, p.8)

The article then moves to the cause of the problematic situation, and this has nothing to do with the financial crises:

"The upheavals in Northern Jutland have nothing to do with the financial crisis. It is rather rooted in the frequent shifts in the technology in the industry, which can quickly make yesterday's winner tomorrow's loser. At the same time the market for the industry's end products can change almost from day to day. When the Japanese telecom operators decided to remove the subsidy for new phones, the market fell by a third, almost overnight."

"Omvæltningerne i det nordjyske har intet med finanskrisen at gøre. Den har snarere rod i de hyppige teknologiskift i branchen, som lynhurtigt kan gøre gårsdagens vinder til morgendagens taber. Samtidig kan markedet for branchens slutprodukter ændre sig næsten fra dag til dag. Da de japanske teleoperatører besluttede at fjerne tilskuddet til nye mobiltelefoner faldt markedet med en tredjedel nærmest natten over." (Carstensen 2008a, p.8)

According to Sven Vestergaard the industry is dynamic, and a number of companies with new technologies are currently entering the market, Apple with its iPhone, Google is underway with its phone and HTC is getting a foothold in the market. And NorCOM members have to constantly find a place to occupy in this dynamic market. Sven Vestergaard is quoted saying:

"No other industry I know of, operates in such a dynamic universe, where, five years ago, it was impossible to predict where we would be today and where it is equally impossible to look five years ahead, but such are the terms, and I think, we have shown, that we have al-

ways been able to address the challenges. The situation with Motorola and Texas is just another challenge that we are preparing for, but it should also be mentioned, that none of the companies are going bankrupt. There will in any case be closures where the employees are given time to look for alternative employment."

"Ingen andre brancher, jeg har kendskab til, opererer i så dynamisk et univers, hvor det for fem år siden var umuligt at forudse, hvor vi ville ende i dag og, hvor det er lige så umuligt at se fem år frem, men det er vilkårene, og jeg synes, vi har vist, at vi hele tiden har været i stand til at tackle udfordringerne. Situationen med Motorola og Texas er blot endnu en udfordring, som vi da forbereder os på, men det bør altså også med, at ingen af virksomhederne går konkurs. Der vil under alle omstændigheder blive tale om lukninger, hvor medarbejderne får tid til at se sig omkring efter alternativ beskæftigelse" (Erhvervsbladet 3/12-2008)

There is a more optimistic heading in Ditcentrum.dk the 11th of December with the message No reason to worry for the mobile industry in Northern Jutland" (Ingen grund til bekymring for nordjysk mobilindustri) (Ditcentrum.dk 2008). In this article two researchers from AAU, Børge Lindberg and Bent Dalum argue, that it is important not to articulate that Northern Jutland is going under, because there is a lot of potential in the region:

"- Overall there are 2700 employees in the companies included in the regional telecom organization NorCom, and this summer we had the highest employment ever, adds Bent Dalum. He and Børge Lindberg warn against Northern Jutland beginning to talk about the region again hitting a crisis. - Across the great plethora of less well-known telecommunication companies are still plenty of growing power, they stress. "

"- Totalt set er der 2700 medarbejdere i de virksomheder, som indgår i den regionale telekom-organisation Norcom, og her i sommer havde vi den højeste beskæftigelse nogensinde, tilføjer Bent Dalum. Han og Børge Lindberg advarer mod, at man i Nordjylland begynder at tale om, at regionen igen er ved at gå i sort. - I hele den store underskov af knap så kendte virksomheder inden for telekommunikation er der stadig masser af grokraft, understreger de." (Ditcentrum.dk 2008, no page number)

The same message is repeated in Nordjyske Stiftstidende the 12th of December, under the heading "Northern Jutland: the mobile fairytale will endure" (Nordjylland: Mobileventyr vil bestå) (Brock 2008b). In this article the research conducted at AAU is highlighted as a factor which will help the cluster through the future structural changes:

"With the university's leading role in telecommunication, Northern Jutland, according to Børge Lindberg, is well prepared for the structural changes that might occur."

"Med universitetets førende rolle inden for telekommunikation står Nordjylland ifølge Børge Lindberg godt rustet til de strukturforandringer, der måtte komme." (Brock 2008b, p.1)

260 employees, mostly engineers, from Motorola are let go the 19th of December 2008. An article in Erhvervsbladet the 12th of December describes how two experts in the industry, John Strand and Karsten Vandrup, will travel to Aalborg to give advice to the laid-off engineers. According to the article, it is necessary that these engineers start new companies, if the cluster is to avoid being seriously weakened (Carstensen 2008b). However, as John Strand argues, the main barrier for this is available capital:

"The biggest barrier is funding. Denmark, as opposed to many of our neighbors does not have a tradition of venture capital companies that focus on telecommunication companies. It also means that those entrepreneurs who, according to politicians, are so important, will be referred to the banks. This is where they will get their startup capital. Exactly, how easy do you think that is, these days? "Asks John Strand rhetorically."

“»Den største barriere er finansieringen. Danmark har, i modsætning til flere af vore nabo-lande ikke nogen tradition for ventureselskaber, der fokuserer på televirksomheder. Det betyder også, at de iværksættere, som ifølge politikerne har så stor betydning, vil være henvist til bankerne. Det er her, de skal hente deres opstartkapital. Hvor let tror du lige, det er for tiden?» spørger John Strand retorisk” (Carstensen 2008b, p.10)

An article in Nordjyske Stiftstidende the 15th of December 2008 brings a more optimistic view of the situation. The heading is “Aalborg: Motorola: BrainsBusiness swings into action” (Aalborg: Motorola: BrainsBusiness går i action) with the sub-title “Lay-offs in the wireless industry are both a crisis and an opportunity, colleagues point out” (Afskedigelser i den trådløse industri er både krise og muligheder, påpeger kolleger) (Brock 2008a). The article mentions that in a joint announcement made by Grimur Lund, CEO of Logimatic and president of IKE Forum Nordjylland, Sven Vestergaard, CEO of AM3D and president of NorCOM as well as Lars Horsholt Jensen, secretariat director of BrainsBusiness, it is stated, quote:

"Motorola's situation is unfortunately a clear testimony that the wireless industry in Northern Jutland is in a period of crisis caused by the ongoing consolidation of the global mobile industry and changing patterns of consumption of mobile technology."

"Motorolas situation er beklageligvis et tydeligt vidnesbyrd om, at den trådløse industri i Nordjylland er i en periode med krise forårsaget af igangværende konsolidering af den globale mobilindustri og ændrede forbrugsmønstre for mobilteknologi." (Brock 2008a, p.22)

Thus technological changes are not mentioned as a cause of the crisis. Instead they are mentioned as a way out:

"On the other hand, the ICT sector takes up a lot of room in the landscape of Northern Jutland and it has been growing significantly over a number of years. That is why the region also houses several thousand highly skilled specialists that can lead to new businesses and continued growth."

"På den anden side fylder IKT-erhvervene, godt i det nordjyske landskab og har været i markant vækst over en årrække. Derfor råder landsdelen også over flere tusinde, meget kompetente specialister, der kan føre til nye firmaer og fortsat vækst." (Brock 2008a, p.22)

And it is emphasized that the ICT industry in Northern Jutland is valuable:

"Over the past 10 years employment in the ICT sector in Northern Jutland has grown by more than 40 percent.

Especially in Aalborg, growth has been almost 100 percent, while in the rest of the country it was below 25 percent. If you look at higher education levels, there has been a tripling in Northern Jutland and more than a fourfold increase in Aalborg. The rest of the country is lagging far behind on that point.

Moreover, ICT in Northern Jutland is good business. An analysis by BrainsBusiness shows that the ICT environment in Aalborg creates the second largest value per employee -just after Copenhagen and well ahead of both Odense and Aarhus. Meanwhile, Aalborg University is the country's largest ICT university receiving a third of all public funds for ICT research. "

"Over de seneste 10 år beskæftigelsen i de nordjyske IKT-erhverv vokset med over 40 procent.

Specielt i Aalborg har væksten været knap 100 procent, mens den i resten af landet var på under 25 procent. Hvis man ser på antallet af højt uddannede er der sket en tredobling i Nordjylland og mere end en firdobling i Aalborg. I resten halter man langt bagefter på det punkt.

Desuden er IKT i Nordjylland en god forretning. En analyse foretaget af BrainsBusiness viser, at IKT-miljøet i Aalborg skaber næststørst værdi per ansat - lige efter København og et godt stykke foran både Odense og Århus. Samtidig er Aalborg Universitet landets største IKT-universitet med en tredjedel af alle offentlige midler til IKT- forskning." (Brock 2008a, p.22)

The same message is repeated in Ingeniøren the 15th of December, with the heading "Proclamation from Aalborg - stop all that talk about crisis" (Opråb fra Aalborg - Stop al den snak om krise) (Simonsen 2008).

A completely different heading is found in Computerworld Online the 23rd of January 2009 with the heading "Beacon of telecom has the knife at its throat" (Telesektorens fyrtårn har kniven for struben) - (Rasmussen 2009c). This article explains that according to Bent Dalum, AAU, the cluster has already been declared dead three times, and it happens each time the technology moves to a new generation of phones. The first time was when the GSM standard came around 1990, then with the change to 3G around 2001 and now with the change to 4G around 2008. He, however, does not believe that the cluster is dead. This is, nevertheless, the opinion of Professor Anders Drejer from Handelshøjskolen Aarhus University, who is quoted saying:

"The cluster is dead. What is left is a number of companies that act as advisers, and you cannot live on that for very long. There is no primary knowledge production or production left."

"Klyngen er død. Det, der er tilbage, er en række virksomheder, der fungerer som rådgivere, og det kan man ikke leve af ret længe. Der er ikke nogen primær vidensproduktion eller produktion tilbage" (Rasmussen 2009c, no page number)

Regarding the technology in the cluster, it is argued, that when 3G arrived on the stage it was hoped that the cluster could maintain the position it had achieved with 2G, but Bent Dalum is quoted saying:

"Back then it was said that the 3G phase would be too big a mouthful for Northern Jutland, and it has proven to be true. Now all that is made is only bits of 3G phones."

"Dengang blev det sagt, at 3G-fasen ville blive for stor en mundfuld for Nordjylland, og det har vist sig at være rigtigt. Nu bliver der kun lavet bidder til 3G-telefoner" (Rasmussen 2009c, no page number)

The same issue is discussed in an article in ElectronicSupply.dk the 23rd of January, where it is reported that Anders Drejer argues that with Motorola's exit from the NorCOM cluster, it is no longer relevant to argue that a cluster exist (ElectronicSupply.dk 2009).

A couple of days later it is announced in Nordjyske Stiftstidende that a merger between NorCOM and IKT Forum is underway (Brock 2009). Together the two organizations represent 600 companies with more than 8000 employees and an annual turnover of more than 15 billion DKK. It is stated in the article that the presidents of the two organisations argue that the merger is not a result of the aforementioned closures of communication and IT companies in the region. Rather, the merger takes place because technologically it is no longer relevant to distinguish between wirelesses and wired technology and the IT industry and the communication industry are melting together and new business areas are emerging. It is also stated that the new association should be a united platform for future growth and the relation to the university is emphasized. Sven Vestergaard, chairman of NorCOM is quoted saying that with the merger the region will be strong and unified when it comes to international cooperation and attracting new companies in for example the medico-industry. The merger results in the new organization BrainsBusiness, which is an association for the ICT industry in Northern Denmark.

This event, the merger of IT Forum and the NorCOM association is important because this event marks the end of the NorCOM cluster as the cluster which has been the subject of the previous analysis. The cluster whose emergence, descent and history the analysis has focused on. Let me be clear here, this event marks the end of the NorCOM cluster which was a specific cluster constructed through the discourses and practices which I have traced above. With this merger, a new situation emerged in the region; the region now had a telecommunications industry and an IT industry joined in the same association, BrainsBusiness. Over the following time the telecommunication industry experienced a number of additional shocks, as I will explain below, and became a relatively small part of the large BrainsBusiness organization, and the discourses and practices and the power-knowledge relations through which the NorCOM cluster was constructed changed. My point is therefore not that the telecommunication industry in the region died or disappeared with this event, what did die was the NorCOM cluster, as it had been constructed through discourses and practices from the late 1980s and up to this event. Consequently, this is where my story of the NorCOM cluster must end. To explain this in a bit more detail, and make some additional arguments as to how this was the end of the NorCOM cluster as it had become known, let me go through some of the articles about the industry afterwards and then elaborate on some points made by key people in the environment.

The 3th of February a new blow hits the wireless industry, as reported in Computerworld Online (Rasmussen 2009b). It is explained that Texas Instruments Denmark has laid off 75 employees the 27th of January, and ETI 62 out of 270 on the 2th of February. Morten Thissen from Ingeniørforeningen i Danmark (IDA) argues according to the article, that at the time of the earlier lay-offs in the wireless industry the people laid off have been employed by other and smaller companies, but this time this process cannot be sustained. Therefore engineers will leave the area. In the discussion of the future of the cluster, and the position of Aalborg at the forefront of wireless communication technology, he argues:

"It is definitely certain that with these redundancies an era is coming to an end. It has become everyday life."

"Det er helt sikkert, at med de her afskedigelser er en æra ved at være forbi. Det er blevet hverdag" (Rasmussen 2009b, no page number)

The lay-offs in the three weeks leading up to the article effect around 400 people, which constitute 13% of the total employment in the cluster. It should be noted that despite the merger between IT Forum and NorCOM, the wireless industry is still articulated as a separate cluster in some articles. Morten Thiessen further argues, on one hand this supports smaller companies in the cluster because they now have access to engineers, and in the other hand some engineers are migrating from the telecom industry to other industries such as medico technology. The chairman of NorCOM Sven Vestergaard hopes, according to the article, that the engineers will stay in the area, because this will attract new companies:

"" The important thing for us is that we as a knowledge region has highly skilled employees in the area, that will always attract some [companies], "says Sven Vestergaard."

""Det vigtigste for os er, at vi som vidensregion har stærkt kompetente medarbejdere i området, for det vil altid tiltrække nogle," siger Sven Vestergaard." (Rasmussen 2009b, no page number)

In May 2009, the state of the industry in the region is mentioned in an article with the heading "AAU: Viewpoint, medical degree makes a difference" (AAU: Synspunkt, Lægeuddannelse gør forskel) (Lund & Vestergaard 2009). The article is written by Grimur Lund and Sven Vestergaard. The point made in the article is that there have been discussions about a medical degree at Aal-

borg University, and that this discussion highlights a transition in Aalborg from a “worker-city” towards a “knowledge-city”. And then the authors turn to the ICT industry, and argue:

"The closure of Motorola and Texas Instruments's departments in Aalborg has naturally taken up a lot of space in the newspapers and other media. Many have lost their jobs and are temporarily pushed into occupational and economic uncertainty. But it is a fact that the IT and communication industry (ICT industry) in Northern Jutland together has strengthened over recent years, so there is now an ICT environment with over 200 companies and more than 8000 employees and 15 billion DKK in revenue. Thus there has been a doubling of the number of employees in ICT companies in Aalborg in the past 10 years."

"Lukningen af Motorola og Texas Instruments afdelinger i Aalborg har helt naturligt fyldt meget i aviser og andre medier. Mange har mistet deres arbejde og er midlertidigt skubbet ud i jobmæssig og økonomisk usikkerhed. Men det er et faktum, at det nordjyske IT- og kommunikationserhverv (IKT-erhvervet) samlet er styrket over de seneste år, så der nu er et IKT-miljø med over 200 virksomheder, over 8000 ansatte og 15 mia. kr. i omsætning. Der er således sket en fordobling af ansatte i IKT- virksomheder i Aalborg over de seneste 10 år." (Lund & Vestergaard 2009, p.20)

And they move on to argue that the so-called “strong environment” around ICT in the region also encompasses these areas between health and technology, in other words, they argue for the diversity in the region. This is an important change to take note of, because now we seen that the discourse around the NorCOM cluster where focus was placed solely on telecommunication research and the jump to 3G or 4G has been replaced by a discourse focusing on other markets than mobile phones, and the combination of competences from different industries, for example the wireless industry, the IT industry and the health industry.

They also re-articulate the statement about the importance of AAU, saying that without AAU the ICT environment would not have been nearly as large as it is. It is argued that AAU is the largest ICT University in the country, have world-class researchers and gets almost one third of all public funds for ICT research in Denmark. After having presented a number of similar positive facts about the industry, they make the argument that a creating a medical degree will support the ICT industry further.

In the middle of June Epn.dk bring a article with the title “Aalborg's telecom industry bubbles with entrepreneurship” (Aalborgs telesektor bobler af iværksættei) (Rasmussen 2009a). The argument is that four new companies have been started at NOVI by engineers from the companies which were closed and two more are underway. Sven Vestergaard argues:

"" I think that you are constantly looking at entrepreneurs who dare and do something. They might not have dared to, so long as we had those big solid companies that could offer people security and good wages," says Sven Vestergaard.

While he stresses that it must not sound as if the closures are an advantage.

"It's also important that we can create the large organizations with 200 to 300 men, so you can gather people and have a concentrated effect out of it, but when the experience is unleashed, you have something to build on," says Sven Vestergaard

""Jeg synes, at man hele tiden ser iværksættere, der tør og gør noget. Det havde de måske ikke turdet, så længe vi havde de der store solide virksomheder, der kunne give folk tryghed og god løn," fortæller Sven Vestergaard.

Samtidig understreger han, at det ikke skal lyde som om, at lukningerne er en fordel.

"Det er også godt, at man kan skabe de store organisationer med 200 til 300 mand, så man kan få samlet dem og få en koncentreret effekt ud af dem, men når erfaringerne slippes løs, har man noget at bygge på," siger Sven Vestergaard" (Rasmussen 2009a, no page number)

The article also states that according to the local business bureau at least 20 new companies have been started as a consequence of the lay-offs in the wireless industry. The head of the labour market committee in IDA, Morten Thiessen, is quoted saying:

"There's a whole lot going on, but it is incredibly difficult to say at this point, if it becomes nothing more than a good idea, that did not come at the right time, or whether there will be an equipment business out of it,"

"Der er en hel masse i gang, men det er utrolig svært at sige på nuværende tidspunkt, om det bliver andet end en god idé, som tiden ikke var til, eller om der kommer en apparatvirksomhed ud af det," (Rasmussen 2009a, no page number)

So what we see here is that another situation has emerged. The boundaries between the wireless industry and the other industries in the region which were previously strongly demarcated have now been demolished, and apparently new ventures are created across these boundaries after the closures of the large wireless companies.

According to the people who were part of the environment this was clearly a new situation in the region, and the NorCOM cluster as it was, had disappeared. A small fraction of the NorCOM cluster continued under BrainsBusiness as a special wireless group, but this was just a small part of the large BrainsBusiness organization and the main reason was that there was still a little money left in the NorCOM organization. According to Jesper Jespersen from NOVI the special spirit, the pioneer spirit, which has characterized the NorCOM cluster had disappeared.,

"That pioneering part, and that spirit that has just gone, just disappeared, right. So it's up to BrainsBusiness to find out how do we get control of things again, for they have the money, they have a large grant from the Region to identify the strengths, identify the strengths we have in NorCOM or, in the region, right. That you could say that the entire telecom industry is a part. But you can also say that the boundaries between what NorCOM stood for, and the IT environment that is there today, they are also a lot more fluent.

"....Den der pioner delen, og den ånd der ligesom var væk, er ligesom forsvundet, ikke. Så er det op til brainsbusiness at finde ud af hvordan får vi så styret tingene igennem, for det er jo dem der har pengene, de har en stor bevilling fra regionen om at pege de styrke positioner, pege på de styrkepositioner man har i NorCOM, eller, i regionen, ikke. Der kan man så sige, at hele teleindustrien er en del af det. Men man kan også sige, at grænserne, mellem det NorCOM stod for, og det it miljø der er i dag, de er også mere udflydende." (Jespersen 2010)

This shows very precisely the death of the NorCOM cluster as it had been constructed over time. We saw above how the core in the cluster was the discourse about being special; the ones who changed the world and launched a technological revolution and brought the mobile phone to the masses, the heritage from DC Development, the unity through the struggle against MNCs in the early 1990s and the other organizations in the region in the 2000s etc. All these discourses were changed with the merger. The pioneer spirit and thus the feeling of unity were gone. And so was the independence from public funding.

It is very important to note, that what I am arguing here is not that the wireless industry died in the region. There are still wireless companies in the area and there is an ongoing discussion whether or not they constitute a cluster in the conventional cluster theory sense, i.e. whether they fulfill different theoretical definitions of what clusters are. Jesper Jespersen for example

argued that he believed that despite the closures and the merger the industry still constituted a cluster in relation to definitions of such.

Let us now look a bit closer at what went on inside the organization in these last years, and thus return to the previous discussions about the practices and discourses within the organization. The interviews showed two important discourses in this regard. One was a discourse about issues which had weakened the association in the final years, and the other was a reflection on whether there had been a need for other business areas and more business talent. One of the things which people reflected on in the cluster was whether the cluster had been doomed from the beginning. Niels Buus used the metaphor of a shipyard:

"It is like a shipyard, because, all those desperate stories in the press about a shipyard. And people at all levels, including the director, are deeply frustrated at the time because they cannot do anything. Because in reality the conditions for doing something or not do something they are put in place at a much, much earlier point in time, and it is driven into a dead-end and there must be something drastic to sort of make that jump ...

... So it is kind of the situations that happen and that is because it happens much earlier. One can argue in Aalborg that, or in NorCOM and the whole group up here, if this defect has not been there all along ...

... Suppose that if, if there had been, the ability to make technology, that is there, it has been there from the start, and that has been created by a lot of good chances all the way back to SP radio and that part of the story. And some of the first were in a way good at doing business. Then at one point this huge demand comes; with the mobile phone an enormously accelerated demand comes around the world, after having made some previous attempts at an early stage here and elsewhere in the world for that matter. And so when it explodes, the ability to do business, it has not kept pace. We have not had it from the start, and it was not necessary at the beginning, because it was easy to be successful without it. Already, when it one-sidedly moves to something that becomes a worldwide trend and a need, etc., we never managed to include that element, because it is not necessary. And then when you get to the rear end of it, you are desperately missing it because it has not grown up [matured].

"Det er lidt ligesom et skibsværft, fordi, alle de der fortvivlede historier i pressen med et skibsværft. Og folk på alle niveauer, også direktøren er dybt frustrerede på det tidspunkt, for de kan ikke gøre noget. Fordi i virkeligheden så er konditionerne for at kunne gøre noget, eller ikke gøre noget, de er lagt på et langt langt tidligere tidspunkt, og man er kørt ind i en blindgyde, og der skal noget drastisk til for ligesom at få taget det hop...

... Altså det er lidt de situation der sker, og det er jo fordi det sker langt tidligere. Man kan argumentere i Aalborg for om, eller i NorCOM og hele sammenslutningen heroppe, om ikke den defekt har været med hele vejen...

... hvis nu at hvis der havde været, evnen til at lave teknologi, den er der jo, den har jo været der fra starten af, og den er kommet af en masse gode tilfældigheder helt tilbage fra SP radio og den del af historien. Og nogle af de første var sådan set gode til at lave forretning. Så på et tidspunkt kommer der en enorm efterspørgsel, der kommer det her med mobiltelefoner, der kommer en enormt accelereret efterspørgsel ude i verden efter at have gjort nogle tidligere forsøg på et tidligt tidspunkt her og andre steder i verden for øvrigt også. Og så da det eksploderer, der er evnen til at lave forretning, den er ikke fulgt med. Man har slet ikke haft den fra starten, og den var slet ikke nødvendig fra starten af, for det var jo nemt at få succes uden at have den. Allerede der hvor det ensidigt går over til noget som bliver en verdensomspændende trend og behov osv, der får man aldrig det element med, fordi det er ikke nødvendigt. Og så når man kommer hen på bagkanten af det står man desperat og mangler det fordi det er ikke blevet vokset op." (Buus 2010)

To this discussion we should therefore ask ourselves the question: is this the difference between say Silicon Valley and NorCOM that in n Silicon Valley there was an abundance of talented business people such as Steve Jobs? When turning to the argument that the engineers in NorCOM were talented technologically, it is also necessary to note, that this argument arose in the late 1990s when MNCs from all over the world came to the cluster. However, this inflow may also have something to do with the demand for engineers worldwide in those years. There was a high demand for engineers, meaning that many MNCs simply acquired engineers if they were available. This is not to argue that the engineers in NorCOM were not talented, it is simply to say, that part of the demand from the MNCs, which were interpreted in the region as sign of a high technological level, could also be due to the fact that MNCs were acquiring whatever they could get in that phase. Niels Buus saw this as an important point and argued:

"... I think this is important; there was a huge demand that grew in those years across the world, where you simply could not get enough engineers for this. If the huge demand had not come, then the engineers had not been great. They had not been incompetent, but they had just not been able to say they were great. Since then there had been no need for them. "

"... det mener jeg er vigtigt, det var altså en enorm efterspørgsel der voksede de år ude i verden, hvor man kunne simpelthen ikke få nok ingeniører til det. Hvis ikke det enorme efterspørgsel var kommet, så havde ingeniørerne ikke været dygtige. De havde ikke været udygtige, men de havde bare ikke kunnet sige de var dygtige vel. Fordi så havde der ikke været behov for dem." (Buus 2010)

Another dynamic that kicked in, in the final years was that the members started to leave the NorCOM association, because they saw it as too expensive. Jesper Jespersen made this point:

"But when NorCOM is squeezed, then it is of course also squeezed because somebody says, no, we do not want to be involved anymore. Sonofon says, you paid some kind of membership fee per development workers you had hired, Sonofon says we do not want to continue to pay. We were estimated to have more than 150 development workers, right. Others say no, that is too expensive for us, it becomes a factor, right. "

"Men når NorCOM bliver presset, så bliver den jo også presset i og med, at der er nogle der siger, nej nu vil vi ikke være med længere. Sonofon siger, man betalte jo et eller andet i kontingent pr udviklingsmedarbejder man havde ansat, Sonofon siger vi vil ikke blive ved med at betale. Vi var skudt til at have mere end 150 udviklingsfolk ikke. Andre siger, nej, det bliver for dyrt for os, det bliver en faktor, ikke. " (Jespersen 2010)

The closures that occurred from 2006 to 2009 also meant that the network of key-people in the cluster started to break up. Niels Chirstian Gjerrild gave some examples to illustrate this:

"There are of course closures, and it is also, of course there are closures. The closures and relocations happen. That is it. Job changes also to some extent, that is, well, what is it called, when Flextronics shut down, well, then Peter Hinerup who was very active, well he is then employed by AAB [locale football club], well, that does not mean that we lose touch with Peter but it means that we work in such completely different areas, so there is not really anything to be together for anymore ...

... And there's Peter Høy, from Thrane & Thrane, who at one point leaves Thrane & Thrane, and become headhunter, which is also a very different perspective on the world. I more or less leave too, but retain an attachment because I establish myself as an independent consultant, and then I end up working for NorCOM, and so I am connected in that way, but otherwise I have left the area too. Well, what's it called, Kim Breum, who sits, who sat on the board, TI closes and, well, he also goes somewhere else. And he is an example of a man who joined, for he was not a part of it from the start. Neither was Peter Høj. But it is open and in-

clusive network, ok, you are, come on board, you must be involved. Flemming Eriksen from Motorola, which was also an active part of it ... "

"Det er jo lukninger, og det er også, jo det er lukninger. Det er lukninger og flytninger der sker. Det er det. Jobskifte også i et eller andet omfang, altså, jamen, hvad hedder det, da Flextronics lukker ned, jamen så er Peter Hinerup som var meget aktiv, jamen han bliver så ansat i AAB, jamen de betyder jo ikke at vi mister kontakten til Peter, men det betyder at vi arbejder på så helt forskellige områder, så der er ikke rigtigt noget at være sammen om længere..."

...Og der er jo Peter Høj, fra Thrane og Thrane, der på et tidspunkt forlader Thrane og Thrane, og bliver headhunter, det er jo også en meget anden vinkel på verden. Jeg forlader jo så-dan set også, men bevarer så tilknytningen fordi jeg etablerer mig som selvstændig konsulent, og kommer så til at arbejde for NorCOM, og så har tilknytning på den måde, men eller så har jeg også forladt det der område. Jamen, hvad hedder det, kim breum, der sidder, der sad i bestyrelsen, TI lukker, og, jamen han går jo også et andet sted hen. Og han er jo et eksempel på en mand der er kommet til, for han var jo ikke en del af det fra starten af. Det var Peter Høj heller ikke. Men det der åbne inkluderende netværk, ok du er, kom med ombord, du skal være med her. Flemming Ericsen fra motorola, som også var en aktiv del af det..."

He also mentioned, that with these people missing, the efforts to include people in the network were not continued:

".... I do not think there is any change in mentality that way, but there are probably, there are not those fireballs who have continued to run the network, so we had continued to invite people inside, so we had continued to grow the network, so that it become, so that it grew into new people. That, I am a little afraid that there is something there ...

".... Jeg tror ikke der er nogen mentalitets ændring på den måde, men der har nok, der har ikke lige været de der ildsjæle der har drevet netværket videre så man er blevet ved med at invitere mennesker indenfor, så man er blevet ved med at dyrke netværket, sådan at det også blev, så det groede ud i de nye mennesker. Det, jeg er lidt bange for at der ligger noget der..." (Gjerrild 2010)

This point was also touched on by Jesper Jespersen. He argued that Niels Buus who was probably the chairman who did most to build the business side of the cluster, had often had the feeling of running his head against a wall, because many of his ideas did not gather support in the NorCOM association, and this in the end lead to loss of momentum.

".... I think when Niels Buus was the chairman, he ran his forehead against [a wall] few times where he thought it was totally unfair that he got a no to some of the ideas he came up with, he represented NorCOM, right. And then at one time you probably expire, then something like that dies by itself, if you do not have a fireball to drag it along. That, that is probably a little of the reason why they are falling down now"

".... Jeg tror da Niels Buus var formand, der rendte han panden imod nogle gange, hvor han syntes det var helt urimeligt at han skulle have nej til nogle af de ideer han kom op med, han repræsenterede jo NorCOM ikke. Og så på et tidspunkt ånder man vel ud, så dør sådan noget af sig selv ikke, hvis du ikke har en ildsjæl til at trække i det. Det, det er vel også lidt af årsagen til at de sådan falder ned nu..." (Jespersen 2010)

Let us use this point to return shortly to the issue of how business was understood in the NorCOM cluster. According to Niels Buus, the lack of focus on business meant that a number of business possibilities were not pursued, and as an example he mentioned satellite communication:

"But what strikes me quite quickly is that there were at the time, and I think there still are, maybe with a few more problems now than then, some huge opportunities if you look at it

positively, because NorCOM and the whole mindset were skills and technology. Not business. And everything, just an example such as the ESA, the European Space Agency, which I have had something to do with during the Terma time. And there were some opportunities and, some opportunities for development projects, etc., and opportunities for money that had to be used in Denmark. And there they built instruments etc. and sent them out into outer space, etc., and actually Denmark is one of the largest in satellite communications. Especially Invasat Satellite Communications, and ESA has huge projects in that field, but Denmark was just not with it. And all the things that happened from Aalborg, and I still think to this day that it is a great mystery, why no one in Aalborg ever logged on and lobbied to get it through ...

... But the whole mindset, which in itself is good enough, it is just trying to be technology supplier and supplier of resources within the mobile industry. But those competences can of course be used in a huge number of other settings.

"Men det der også ret hurtigt slår mig, det er at der lå på det tidspunkt, og det mener jeg stadigvæk ligger, måske med lidt flere problemer nu end dengang, nogle kæmpestore muligheder, hvis man ser positivt på det, fordi NorCOM, og hele tankesættet var kompetencer og teknologi. Ikke forretning. Og hele, bare sådan et eksempel som indenfor ESA, European Space Agency, som jeg har haft noget at gøre med i Terma tiden, Og der lå jo nogle muligheder og, nogle muligheder for udviklingsprojekter osv., og muligheder for penge som skulle bruges i Danmark. Og der byggede man instrumenter osv og sendte dem ud i ydre rum osv., og rent faktisk så er Danmark et af de største indenfor satellitkommunikation. Specielt Invasat Satellit Kommunikation, og ESA har kæmpe store projekter indenfor det, men Danmark var bare ikke med på det. Og alle de ting der, de foregik fra Aalborg, og jeg synes stadig i dag det er et stort mysterium, hvorfor er der ingen i Aalborg der nogensinde har logget sig på det og lobbyet for at få det igennem...

... Men hele tankesættet, som jo i sig selv er godt nok, det er bare at prøve på at blive teknologileverandør og leverandør af ressourcer indenfor mobil branchen. Men de kompetencer kan jo bruges i en enorm mængde andre tilfælde." (Buus 2010)

The discourses and practices in the cluster meant that people focused only on mobile phones. According to Niels Buus maybe the focus on technology was the easy solution which would explain why this view was continuously supported and re-articulated:

"But it is probably the easy solution. So it is, like I said before, it is rather difficult to argue that it is not going well, when the whole world is flocking to Aalborg to create development centers. And I think that, then you can say that it is perhaps too short-sighted in one way or another. And I think that when we talk about those who should see it first, or them, if you are really thinking about your field, those, it is naive, what I am saying right now, but anyway, the politicians should have seen it. Business owners or managers should also have seen it; there is more money in it. But it's hard because everybody needs a short-term solution. I think that perhaps in such a situation there is a need for pioneers. To respond in time, but conversely, I do not think that I can point to someone anywhere in the world who would have seen this in time."

"Jamen det er jo nok lidt den lette løsning. Altså det er jo, som jeg sagde før, det er lidt svært at argumentere for at det ikke går godt, nu når der er, hele verden den strømmer til Aalborg for at lave udviklingscentre. Og jeg synes der, altså man kan sige, at det er måske for kortsigtet på en eller anden måde. Og jeg synes at når vi nu snakker at dem der skulle kunne se det aller først, eller dem, hvis man virkelig tænker på sit område, der, nej det er naivt det jeg siger nu, men alligevel, politikkerne burde have set det. Virksomheds ejerne eller lederne burde også have set det, der er flere penge i det. Men det er jo svært fordi alle sammen har brug for en kortsigtet løsning. Der hvor jeg synes der måske, i sådan en situation er der brug for pionerer. For at få reageret i tide, men omvendt, så tror jeg heller ikke at jeg nogen steder i verden kan pege på at der er nogen der ville have set det her i tide." (Buus 2010)

There is also quite a difference between doing development work and doing business, and there were no tradition for doing business among the engineers, as Niels Buus explained:

"But there is no tradition for it. There is no tradition for it at all. It is my contention, and you sometimes hear that we must be business minded, what does that mean? That is also difficult. So what does it mean to make some things and use the things you can for something customers need. And now, since then have come all this with user-driven innovation, etc., that has started a lot of activities, even then it is not just creating a formula. Because it is something that is hard. And it's something where you also have to, you got to be able to convince the customers, in addition to price and functionality must be right; that one can also get permission to sell it. You have to compete with others in those situations, right. And there is a long way from the thinking that goes on in a development department to something that creates business. Now we can try to think of NorCOM here, how many businesses are started each year and how many becomes a success. There must opportunism, and there must be room for opportunism, and there is also a need for talent in that field. But above all opportunism. A few things must be tested before you are there. So there is far from the [needed] consciousness out here. One must understand the customers; one must understand how customers think."

"Jamen der er slet ingen tradition for det. Der er slet ingen tradition for det. Det er min påstand, og man hører sommetider, at vi skal være forretningsmindede, hvad vil det sige, det er også svært. Altså hvad vil det sige at få lavet nogle ting, og bruge de ting man kan til noget kunderne har brug for. Nu sidenhen er der kommet alt det her med brugerdreven innovation, osv., der er sat en masse aktiviteter i gang, selv da er det jo ikke bare at lave en formel. Fordi det er noget der er svært. Og det er noget hvor man også skal, man skal jo kunne overbevise de kunder om, ud over at pris og funktionalitet skal være rigtigt, at der, at man kan få lov til at afsætte det. Man skal konkurrere med andre i de situationer ikke. Og der er altså langt fra den tanke virksomhed der foregår i en udviklingsafdeling ud til at det er noget der giver forretning. Nu kan vi prøve at tænke på NorCOM her, hvor mange virksomheder der bliver startet om året, og hvor mange der ender i succes. Der skal opportunisme til, og der skal være plads til opportunisme, og der skal også dygtighed til på det område. Men frem for alt opportunisme. Der skal afprøves nogle ting, før man er der. Så der er langt fra den bevidsthed herude. Man skal forstå kunderne, man skal forstå hvordan kunderne tænker." (Buus 2010)

One solution to the issue, could have been, according to Niels Buus, to create an organization where both technical as well as business competences were present. This, however, raised the challenge that there were not enough people who were engineers and could change over to a business focus and in small companies a technical understanding is necessary to sell the goods. To be more precise, the problem was not the fact that it was engineers who were in management positions because it had to be engineers in those kinds of companies. The issue was that these engineers only possessed the technological focus, and had difficulties accepting the importance of other types of competences and incorporating these into the organizations:

"It is a problem that they cannot integrate other types of people, it's a management problem, although I value these people enormously, that is not what it is about, right, but they cannot integrate people with other competences they cannot accept people with other competences, you can say it is because they are engineers, but then if, so it is like that everywhere, there will always be some kind of balance of power in that one leads "

"Det er et problem at de ikke kan integrere andre typer mennesker, det er jo et ledelsesmæssigt problem, selv om jeg sætter enorm pris på de mennesker, det er slet ikke det det handler om vel, men de kan ikke integrere mennesker med andre kompetencer, de kan ikke acceptere mennesker med andre kompetencer, så kan du sige det er fordi de er ingeniører, men altså hvis, sådan er det alle steder, det vil altid blive en eller anden form for magtbalance i og med man bestemmer." (Buus 2010)

Looking at the NorCOM association in relation to the interest, or lack thereof, in business, Niels Buus argued that the fighter-instinct was lacking completely, and had always been missing:

"There was a trip to Nice, for some of the money that had been collected and there was Tom Kristensen, and there were super entrepreneurs who came and talked to us and there were some discussions at to whether we should have more [members] in the club etc. It has never been there. There have been a, what is it called, neither the board nor the members had a belief that the NorCOM board could do anything to, and that NorCOM could do something increase the survival chances in Northern Jutland. It has never been there. So it was that lowest common denominator....

... But then we might as well call things what they were. We could sit and draw a nice picture, but we might as well call it what it was. That was what it was. "

"Der var en tur til Nice, for nogle af de penge der var samlet op, og der var Tom Kristensen, og der var super iværksættere der kom og talte for os, og der var nogle diskussioner om vi skulle være flere i klubben osv. Den har aldrig været der. Der har ikke været en, hvad hedder det, hverken i bestyrelsen men heller ikke for medlemmerne en tro på, at NorCOMs bestyrelse den kunne gøre noget for, og at NorCOM kunne gøre noget for at overlevelseshancerne i Nordjylland var bedre. Den har aldrig været der. Så det, den var den der lave fælles nævner....

...Men altså vi kan lige så godt kalde tingene det de var. Vi kunne godt sidde og lave et pænt billede af, men vi kan lige så godt kalde det hvad det var. Sådan var det." (Buus 2010)

This issue of a lack of interest in other things besides technology goes, as the analysis above shows, straight to the core of the story of the NorCOM cluster, which through the discourses and practices analyzed above had been constructed as a cluster which centred on technology. The focus among the engineers and managers were on technology. And as we saw in the TIDK case, this focus on technology had consequences for the people in TIDK in relation to the political games, which meant that they found it difficult to claim a *raison d'être* within the TI organization. This is an important issue which I will discuss in detail in the next chapter when I analyze the story of TIDK and the story of the NorCOM cluster. One might wonder whether TIDK was a special case in this respect. Above it was argued that all the MNC subsidiaries faced the political games within their respective organizations, and just to shed a bit more light on how this occurred, I would like to end this chapter by analyzing the discourses emerging around another successful MNC subsidiary, or at least a subsidiary which at certain points in time was characterized in discourses as successful. And this company is Digianswer. Let us therefore examine this company to see if there are similarities between Digianswer's experiences and those of TIDK.

8.9 Digianswer and the NorCOM approach to work

Ole Nørgaard Jensen, called Ole Inventor, started this company in 1986 located in Nibe and became the CEO. Two large customers of Digianswer were Philips, which Digianswer produced a phone answering machine for, thereby the name Digianswer, and Storno, which was later bought by Motorola (Bredsdorff 1999b). By 1996 the company was developing a product called a "Home Communication Center" which was to be sold under Digianswer's own name. This project was dependent on funding from the Danish fund "Vækstfonden" i.e. the "Growth Fund":

" Without help from the Vækst Fonden [Growth Fund] our advanced phone, Home Communications Center, had never amounted to anything. The project was so large that the financial side had been a risk to the rest of the company. " CEO Ole Jensen from the company Digianswer A/S in Northern Jutland did not conceal the fact that the idea of an intelligent replacement for the old phone would never have been carried out the company alone. But Vækstfonden saw the potentials in Ole Jensen's project and contributed 45 percent of the to-

tal project development cost of 15 million DKK. Today we have sold approx. 25,000 units of the Home Communication Center, which has given the company a turnover of approx. 40 million DKK. The majority is exported"

"Uden hjælp fra VækstFonden var vores avancerede telefon, Home Communication Center, aldrig blevet til noget. Projektet var så stort, at det økonomisk havde været en risiko for resten af virksomheden." Direktør Ole Jensen fra virksomheden Digianswer A/S i Nordjylland lagde ikke skjul på, at ideen om en intelligent afløser for den gammeldags telefon aldrig ville blive ført ud i livet af virksomheden selv. Men VækstFonden så perspektivet i Ole Jensens projekt og gik ind med 45 pct. af projektets samlede udviklingsomkostninger på 15 mio. kr. I dag er der solgt ca. 25.000 eksemplarer af Home Communication Center, hvilket har givet virksomheden en omsætning på ca. 40 mio. kr. Hovedparten går til eksport" (Kristensen 1996, p.3)

Ole Jensen heard about Vækstfonden from his accountant and the funding meant that the necessary knowledge base for the project was build in Digianswer. This knowledgebase was located in approximately 12-14 engineers in 1996. The actual production of the Home Communication Center took place at a supplier in Finland. The Home Communication Center was a combination of a phone and a digital answering machine, and the core knowledge in the company was knowledge of digital signal processing in the years 1996-1997.

In an article in Berlingske Tidende the 11th of April 1997 it is stated, that 1996 became a record year for Vækstfonden, because through spending 1,3 billion DKK worth of venture capital it had created 800 jobs (Steno 1997). 10 of these were engineer jobs at Digianswer in Nibe. The funding not only made the Home Communication Center project possible, it also meant that Ole Jensen could keep control of his company , as he explained:

" »I needed 20 million DKK for the project. If I should have raised it together with the shareholders of Digianswer, I should have put additional capital in or ceded control of the company. And the latter I would not do. Now I got the favourable loan from Vækstfonden [growth fund] instead and we could get started, "says Ole Jensen, who already as a boy won an inventor competitions arranged by the Philips group." (Berlingske Tidende 4/11-1997)

"»Jeg skulle bruge 20 mill. kr. til projektet. Hvis jeg selv skulle have realiseret det sammen med aktionærene i Digianswer, skulle jeg have skudt yderligere kapital ind eller afgive kontrollen med virksomheden. Og det sidste ville jeg ikke. Nu fik jeg så det favorable lån i vækstfonden i stedet og kom i gang,« fortæller Ole Jensen, der allerede som dreng vandt opfinder-konkurrencer udskrevet af Philips-koncernen." (Steno 1997, p.2)

The 22th of April 1999 Reuters announces, that Dansk Kapitalanlæg has sold its stock post in Digianswer, 31,85 percent, to Olicom Ventures. Olicom has thereby raised its share of the stocks in Digianswer to 66% and obtained pre-emptive rights for the remaining stocks (Reuter Finans 1999a). The same day it is announced in another article in Reuters, that the future still looks bleak for Olicom, but that Olicom hopes to make a profit from the Digianswer stocks (Reuter Finans 1999c). The 23rd of April 1999 Erhversbladet runs an article describing that Digianswer is making progress on the Bluetooth standard. The article also gives a view into the core competences of Digianswer at the time:

"Among the company's core business is design and development of products and technologies for mobile communication, hands free telephones, voice recognition and software for digital processing of speech. Its customers include some of the major mobile phone manufacturers. The company is reported to be at the forefront of the development of the implementation of the new, so-called Bluetooth technology. Bluetooth is a standard that the

IT companies IBM, Toshiba and 3Com as well as mobile phone manufacturer Ericsson is involved in."

"Blandt firmaets kerneområder er design og udvikling af produkter og teknologier til mobil kommunikation, håndfri telefon, voice recognition og softwareprogrammer til digital bearbejdelse af tale. Blandt kunderne er bl.a. nogle af de store producenter af mobiltelefoner. Virksomheden angives at være i forreste linie i udviklingen af implementeringen af den nye, såkaldte Bluetooth teknologi. Bluetooth er en standard, som IT-selskaberne IBM, Toshiba og 3Com samt mobiltelefonproducenten Ericsson er involveret i." (Egholm 1999, no page number)

This also shows that the company has R&D relations to some of the bigger players in the wireless industry, IBM, Toshiba, 3Com and Ericsson. In a Computerworld article the 27th of April 1999, it is again stated that Olicom has financial problems, but that they hope to make a profit from the Digianswer stocks, especially due to the Bluetooth competences within the company (Hilbert 1999). At this time, Niels Christian Furu was the CEO of Olicom. During the summer of 1999 a number of articles mention Olicom's financial troubles, and often the Bluetooth technology and Digianswer is described as the key to resurrecting the company.

The 17th of May 2008 Computerworld runs an article about a rating scale used to rate firms' economic situation, called "Dun & Bradstreet's AAA-stamp" (Dun & Bradstreet's AAA-stempel) (Andersen 1999). It is explained, that a score of AAA indicates that there is less than 1,3% chance that the company in question will experience problems of payments or bankruptcy within the next 12 months. In the list of companies accompanying the article Digianswer receives an AAA score. So according to the media the economic situation in Digianswer is relatively good at this time, whereas Olicom is struggling economically.

The 17th of May 1998 Berlingske Tidende also brings an article about the Bluetooth technology, and here Digianswer is mentioned as one of the Danish firms working with the technology along with B&O, Bosch Telecom, Eurocom Industries, GN Netcom, Lego, Olicom and Oti (Møller 1999b). In an article about Bluetooth the 25th of May 1999 in Computerworld, it is also stated that there has been an R&D relation between Ericsson and Digianswer since 1997:

"Danes have helped put Ericsson at the forefront of Bluetooth. When the telecommunication manufacturer two years ago decided to invest in new technology, they turned to the developing company Digianswer in Nibe. In the autumn, this led to Digianswer being the first to show a functioning Bluetooth, just like they at the spring's CeBIT trade fair was the first to introduce a wireless headset."

"Danskere har været med til at bringe Ericsson i front, hvad angår Bluetooth. Da teleproducenten for to år siden besluttede at satse på den nye teknologi, henvendte de sig til udviklingsvirksomheden Digianswer i Nibe. Det førte til, at Digianswer i efteråret, som de første, kunne vise Bluetooth i funktion, ligesom de på forårets CeBIT-messe var først til at præsentere et trådløst headset." (Troelstrup 1999, p.22)

The 21st of June 1999 Erhvervsbladet runs an article about Bluetooth (Carstensen 1999a). Here it is described, that Digianswer might be best known by the public because of its Home Center, but despite the commercial success of this product, it never made Digianswer large profits. Production of the product was therefore cancelled after a few years because of fierce competition on the market for consumer IT products:

"In the consumer's eyes the Nibe Company is probably best known for its Home Communications Center, which coupled a digital answering machine with a digital fax and a floppy link to the pc. The voice-activated machine became a big commercial success but never a financially rewarding venture for Digianswer. Production stopped after just a few years because

of the frantic price competition in the market for domestic IT products. There appears to be more of a future in Bluetooth, where Digianswer has achieved a leading position in the development of this new technology”

”I forbrugerrøjne er Nibe-virksomheden nok mest kendt for sit Home Communications Center, der sammenkoblede en digital telefonsvarer med en digital fax og med et diskette-link til pc”en. Den stemmestyrede maskine blev en stor kommerciel succes, men aldrig nogen givtig økonomisk forretning for Digianswer. Produktionen stoppede efter blot et par år som følge af den hæsblæsende priskonkurrence på hjemme-IT produkter. Mere fremtid er der i Bluetooth, hvor Digianswer har opnået en frontposition i udviklingen af den nye teknologi” (Carstensen 1999a, no page number)

The article further explains that it is not the strategy of Digianswer to sell Bluetooth products under their own name, rather they should mainly be supplied to companies in the mobile industry, as well as other industries with a potential:

”According to the CEO there are no plans to directly develop products to be sold under its own name, as was the case with the Home Communications Center. - We will primarily use Bluetooth in our products especially for the mobile industry while developing integration solutions to all sorts of companies who may need Bluetooth technology, he explains”

”Ifølge direktøren har man ikke planer om direkte at udvikle produkter, der skal sælges i eget navn, som det var tilfældet med Home Communications Center. - Vi vil først og fremmest bruge Bluetooth i vore produkter til ikke mindst mobiltelefonbranchen og samtidig udvikle integrationsløsninger til alle mulige andre, der måtte have behov for Bluetooth-teknologi, forklarer han” (Carstensen 1999a, no page number)

The 28th of July 1999 the economic situation in Olicom has reached a state where the company is negotiating with different partners about collaborations or sale of parts of the company, according to an article in Erhvervsbladet (Skaanning 1999). The article also explained that Søren Hovgaard is CEO for Olicom Investor Relations. An article in Computerworld the 30th of July suggests, likewise, that Olicom probably is on the brink of closure (Bredsdorff 1999c). One of the reasons is stated to be that the core competences of Olicom is the Token ring technology, which despite its technological superiority has been completely overrun by the Ethernet technology on the market. Because of this Olicom is focusing on Ethernet technology, ATM technology and Bluetooth Technology, the last of these competences is located in Digianswer. The article further mentions that because of the economic situation in Olicom, some of its engineers have left the company.

An article from Erhvervsbladet the 24th of August explains, that Dansk Kapitalanlæg A/S has earned 13,9 million from its shares in Digianswer in the first half of 1999 (Skaanning 1999). And RB-Børsen has an article the 25th of August in which it is explained, that Olicom is in the process of selling Digianswer for a three-digit million figure (RB-Børsen 1999c). The 27th of August, Computerworld runs an article with the headline “Digianswer for sale for a three-digit million figure” (Digianswer til salg for trecifret millionbeløb), in which it is explained that Olicom is selling Digianswer because of its financial problems. It also states, that the turnover in Digianswer in 1998 was 35 million DKK (Bredsdorff 1999a).

The 31st of August Reuters runs an article that explains that Olicom has sold its Token Ring business to Madge Networks N.V. (Reuter Finans 1999b). The day after, the 1st of September, Politiken describes that the sale of its Token Ring business has given Olicom a loss of 60 million DKK. Olicom made approximately 100 million DKK from the sale, but because of the sale Olicom also had to depreciate the value of their stock with a 160 million DKK. The article also explains

that the technical CEO of Olicom, Niels Jørgensen, has left the company, and that the future for Olicom now looks bleak (Benson 1999).

The 2nd of September RB-Børsen runs an article which, referring to an article in Computerworld, explains that Intel intent to acquire the rest of Olicom (RB-Børsen 2011). This rumour is verified a week later when Computerworld runs an article the 7th of September in which it is described that Intel has confirmed its plans to buy Olicom (Marquart & Sørensen 1999). The 20th of September Ritzaus Bureau announces in an article that Olicom has sold 220 employees from its development departments in Copenhagen and Gdansk to Intel, and the company is still trying to sell Digianswer (Ritzaus Bureau 1999a). In the following days several articles appear in different papers that state that Olicom is being dissolved, and the 24th Computerworld announces that Digianswer is put up for auction (Computerworld 1999). Several articles follow in different media about the financial troubles of Olicom and the sale of Digianswer.

Finally, the 27th of October 1999, RB Børsen can announce, that Digianswer has been sold to Motorola (RB-Børsen 1999b). The article further explains, that Ole Jensen personally owned one third of the shares in Digianswer, but it is uncertain whether Motorola has bought his shares too. In another article the same day in RB Børsen, it is stated that Digianswer will remain in Nibe and that the company will continue as it had before:

"Digianswer are staying in the town of Nibe in Northern Jutland, in an enlarged form, although the U.S. technology giant Motorola has bought at least two thirds of the shares. That is what the director and shareholder Ole Jensen said at a press conference in Copenhagen on Wednesday. - It was important for both Motorola and for us that Digianswer retained its identity and maintaining its link to Northern Jutland, said Ole Jensen. And Vice President of Motorola, John Steadman, added: - Digianswer will continue as before. That is something that both Digianswer and we are happy about. We will maintain the spirit that is present in Digianswer, said Steadman"

"Digianswer bliver i den nordjyske by Nibe i forstørret udgave, selv om den amerikanske teknologi-gigant Motorola har købt mindst to tredjedele af aktierne. Det sagde direktør og aktionær Ole Jensen på et pressemøde i København onsdag. - Det var vigtigt både for Motorola og os, at Digianswer beholdt sin identitet og bevarer tilknytningen til det nordjyske, sagde Ole Jensen. Og Vice President i Motorola, John Steadman, supplerede: - Digianswer vil fortsætte som hidtil. Det er noget, som både Digianswer og vi er glade for. Vi vil bevare den gejst, som er i Digianswer, sagde Steadman" (RB-Børsen 1999a, no page number)

Given the discussions above, it is important to note here, that Ole Jensen states that it is important that Digianswer keeps its "identity", and that the Vice president from Motorola states that the company will be allowed to continue as before. We saw the same thing happening in TIDK at the time of the acquisition.

It is further explained in the article that Digianswer has to increase its number of engineers; some of them might come from EuroCom, which announce the same day that they were firing people. It is also mentioned that Digianswer for some time had been cooperating with GN Netcom, a producer of headsets (RB-Børsen 1999a). In an article about the sale, on the 28th of October in Berlingske Tidende, it is explained that the price of Digianswer was not as high as it would have been if the company had been located in Silicon Valley:

"If Digianswer had been in Silicon Valley, the price would probably be around 60 to 120 million dollars (420 to 840 million DKK). But such large sums are not involved, says a source in one of the three interested companies. "It gives a certain discount when the company is 11 flying-hours away," the source says"

"Hvis Digianswer havde ligget i Silicon Valley, ville prisen formentlig være i størrelsesordenen 60 til 120 mio. dollar (420 til 840 mio. kr.). Men så store beløb er der ikke tale om, fortæller en kilde i et af de tre berørte firmaer. »Det giver en vis rabat, når virksomheden ligger 11 flyvetimer væk,« fortæller kilden" (Møller 1999a, p.7)

The article further elaborates on the point that it is Motorola's strategy that Digianswer shall keep its own culture after the acquisition:

"Motorola's John Steadman, who signed the deal Monday night, confirms that Digianswer will continue under its own name and with the special corporate culture that Ole Jensen has created. "You must consider each acquisition separately and see what shall happen with it. Digianswer is a company that should continue as is," said John Steadman, who breaks with Motorola's longstanding policy of including acquisitions in the big machine. Instead, Motorola will integrate the Digianswer-peoples' skills in the chips- integrated circuits – that the American giant manufactures. "For us it means working closely with one of the world's largest chip manufacturers. It is perfect for Digianswer," says Ole Jensen"

"Motorolas John Steadman, der underskrev aftalen mandag aften, bekræfter, at Digianswer fortsætter under eget navn og med den særlige virksomhedskultur, som Ole Jensen har skabt. »Man må vurdere hvert opkøb for sig og se, hvad der skal ske med det. Digianswer er en virksomhed, der skal fortsætte som den er,« siger John Steadman, der bryder med Motorolas mangeårige politik for at indlemme opkøb i den store maskine. I stedet vil Motorola integrere Digianswer -folkenes kunnen i de chips - integrerede kredsløb - som den amerikanske gigant fremstiller. »For os betyder det tæt samarbejde med en af verdens største chip-producenter. Det er perfekt for Digianswer ,« siger Ole Jensen" (Møller 1999a, p.7)

In an article in Computerworld the day after, the same message is repeated:

"One of the consequences of the fact that Motorola is not buying all the shares in Digianswer are that the Nibe-based company will continue to cooperate with all of its current customers. They include virtually all of the major manufacturers of mobile phones, Motorola's competitors. - We will maintain the spirit in Digianswer, so we shall not have a staff handbook with seven binders from Motorola. We will also maintain our clients because they help to ensure that we develop ourselves, explains Ole Jensen. Yet he is well aware that the long-term relationship between Motorola and the other clients can change quite substantially. He points out that the division of Motorola, which buys Digianswer does not compete directly with Digianswer's other customers. One division, which Digianswer must work with, is almost new and deals with "personal network". This type of network is only about to be developed now, but visions of the refrigerator, which communicates wirelessly with the computer and stove have been aired before"

"En konsekvens af, at Motorola ikke køber alle aktierne i Digianswer er, at Nibe-virksomheden fortsat vil samarbejde med alle sine nuværende kunder. De omfatter blandt andet så godt som alle store producenter af mobiltelefoner, Motorolas konkurrenter. - Vi vil bevare ånden i Digianswer , så vi skal ikke have en personalehåndbog med syv ringbind fra Motorola. Vi vil også bevare vores kunder, for de er med til at sikre, at vi udvikler os, forklarer Ole Jensen. Alligevel er han godt klar over, at på længere sigt kan forholdet mellem Motorola og de øvrige kunder rykke sig ganske væsentligt. Han påpeger, at de divisioner af Motorola, som køber Digianswer , ikke konkurrerer direkte med Digianswers øvrige kunder. Den ene division, som Digianswer skal samarbejde med, er næsten ny og beskæftiger sig med "personlige netværk". Den type netværk skal først til at blive udviklet nu, men visionerne om køleskabet, der kommunikerer trådløst med computeren og komfuret har været luftet tidligere." (Bredsdorff 1999b, p.4)

It further emphasizes that Ole Jensen is different compared to the Motorola managers, and that he intends to stay that way:

"But the founder has kept both feet on the ground. He stands beside the Motorola managers in a modest jacket, where watchful eyes will notice several loose threads, with a sweater underneath and no tie. Ole Jensen takes it seriously too when he talks about preserving a particular Digianswer spirit. There are few Danish companies that are buying a Porsche for their employees, but that is what he has done. The employees, most of whom are bachelors, can earn the right to borrow the Porsche and impress the girls for a month. The sports car can be used by the employee of the month, which will be chosen by the workers themselves"

"Men stifteren har holdt begge ben på jorden. Han stiller op ved siden af Motorola-cheferne med en beskeden jakke, hvor det vågne øje finder indtil flere løse tråde, med sweater indenunder og intet slips. Ole Jensen mener det også alvorligt, når han taler om at bevare en særlig Digianswer-ånd. Det er få danske virksomheder, som anskaffer en Porsche til deres medarbejdere, men det har han gjort. Medarbejderne, hvoraf de fleste er ungkarle, kan gøre sig fortjent til at låne Porschen og imponere pigerne en måned. Sportsvognen kan benyttes af månedens medarbejder, som bliver kåret af medarbejderne selv" (Bredsdorff 1999b, p.4)

Two weeks after the takeover of Digianswer by Motorola, the 12th of November 1999, Ingeniøren runs an article with the heading "People from Northern Jutland first with Bluetooth" (Nordjyder først med Bluetooth) (Ingeniøren 1999). It is described that Digianswer has beat Ericson in the competition to be the first to provide a Bluetooth product, since Motorola now has the first Bluetooth product on the market. An engineer from Digianswer explains in the article:

"One of the reasons that Digianswer came first, is that the company has based its Bluetooth module on a digital signal processor (DSP) says engineer Thomas Kjær Nielsen. Others have chosen to focus on an ASIC circuit. A DSP is easier to reprogram, making the development process flexible and quick. If there is a bug in an ASIC, the entire circuit layout has to be changed. It takes time and costs money. On the flip side, ASIC devices are cheaper to mass produce than DSPs."

"En af årsagerne til, at Digianswer kom først, er at virksomheden har baseret sit Bluetooth modul på en digital signal processor (DSP) fortæller civilingeniør Thomas Kjær Nielsen. Andre har valgt at satse på en Asic-kreds. En DSP er enkel at omprogrammere, og det gør udviklingsforløbet fleksibelt og hurtigt. Hvis der er en fejl på en Asic, skal hele kredsens layout laves om. Det tager tid og koster penge. Til gengæld er Asic kredse billigere at masseproducere end DSP'er." (Ingeniøren 1999, p.4)

It is further explained that Digianswer in the previous years has developed DSP products for several large companies:

"In the past five years Digianswer has developed a wide range of DSP-based products for telecommunication. Bosch, Ericsson, Motorola, Philips, Siemens and Sony all use Digianswer technology in their products. Most of the 55 employees are currently working on Bluetooth"

"I de seneste fem år har Digianswer udviklet en lang række DSP baserede produkter til telekommunikation. Bosch, Ericsson, Motorola, Philips, Siemens og Sony bruger Digianswers teknologi i deres produkter. Hovedparten af de 55 medarbejdere er i dag beskæftiget med Bluetooth." (Ingeniøren 1999, p.4)

An article from Computerworld the 6th of December 1999 shows, that the acquisition by Motorola meant that the awareness of Digianswer grew (Horsager 1999). The article deals with the Comdex Fall trade fair in Las Vegas that year: in relation to the Bluetooth technology, a person from Digianswer states that the company has come closer to the goal of producing a Bluetooth chip for less than 5 dollars. This 5 dollars goal was mentioned in several newspaper articles dealing with Bluetooth through 1999. Interestingly, the person from Digianswer also states that the awareness about Digianswer grew as a consequence of Motorola's ownership:

"We are close to achieving the first goal with a standard five U.S. dollars Bluetooth chip. And we have experienced a whole different level of interest and understanding than before because we now have Motorola backing us, says Tomas O'Raghallaigh from sales and marketing at the Nibe company Digianswer, which Motorola took over from Olicom in the fall"

"Vi er tæt på at nå det første mål med en standard fem dollars Bluetooth-chip. Og vi har oplevet en hel anden interesse og forståelse end tidligere, fordi vi nu har Motorola i ryggen, fortæller Tomas O'Raghallaigh fra salg og marketing hos Nibe-virksomheden Digianswer, som Motorola i efteråret overtog fra Olicom." (Horsager 1999, p.28)

The focus on Bluetooth continued the next while. Berlingske Tidende runs an article about GN Netcom the 25th of February 2000, and in this it is stated that GN Netcom had developed its Bluetooth technology in cooperation with Digianswer, a cooperation that had continued unaffected by the acquisition by Motorola six months earlier (Lund & Lai 2000).

The work on Bluetooth continues, and according to an article in Ingeniøren the 12th of May 2000, the Bluetooth club has 2000 members, and the specification is now more than 1500 pages long at this time, but it will still take years, according to the article, before Bluetooth consumer products can be found in the shops. However, some companies are starting to deliver Bluetooth test equipment, and among these is RTX Telecom, delivering equipment to test the RF part of the Bluetooth solution, and Digianswer, delivering equipment to test the Bluetooth protocol stack (Krøyer 2000a).

Several articles in different media in the latter part of 2000 talks about Bluetooth technology, and argues that Northern Jutland is a key area in relation to this technology, with successful companies such as Digianswer, RTX Telcom and Ericsson working on this technology.

The 31st of January 2001 Erhvervsbladet runs an article with the story that the British semiconductor company CSR (Cambridge Silicon Radio) has started an aggressive hunt for employees with Bluetooth competence in Northern Jutland, with the objective of creating a site in Aalborg. In the same article RTX Telecom and Digianswer are referred to as two of the leading Bluetooth companies in the world (Carstensen 2001).

Digianswer grows in this phase. The 15th of March Erhvervsbladet runs an article saying that Digianswer has started to build 1400 square meters of new office space, to accommodate its fast growing staff. A similar construction project was carried out a year earlier, but the number of employees has now passed a 100, and the growth is expected to continue (Erhvervsbladet 2001). The 5th of April Jyllands-Posten runs an article which also deals with this construction project in more details (Nordhagen 2001b). Originally, Digianswer had 600 square meters, but this had by 2000 been expanded to 1400 square meters, and now the plan is, according to the article, to build another 1400 square meters plus a 700 square meter cellar. At this time, the company has 105 employees in Nibe and controls the development work of another 80 employees at Motorola's Bluetooth sites in Austin and Phoenix, USA. At the time of the sale to Motorola Digianswer had 60 employees (Møller 1999a). 5 months later, in March of 2000, this number had risen to 80 (Qvist 2001). Further, in the article it is stated, that Digianswer are searching for around 40-50 engineers to hire. Financially, Digianswer has tripled its turnover and profits within a year. The growth of the organization has, as these numbers suggest, been rapid.

The growth of the company after the acquisition by Motorola, was apparently also accompanied by a change in the organization of the company. In articles from around the acquisition by Motorola, it is stressed, that Digianswer should keep its own company culture. Articles in 2001 sug-

gest, however, that things have changed with the growth of the organization. Ole Jensen is quoted in an article in Jyllands Posten the 5th of April 2001:

"" I am innovative. Not an organizer, so I do not dream about being the CEO when we one day have 100 or 200 more employees in the company. My time at Digianswer will not last forever, and I have a lot of ideas, so some time in the future I will become an entrepreneur again," says Ole Jensen

""Jeg er innovativ. Ikke organisator, så jeg drømmer ikke om at være direktør, når vi en dag er 100 eller 200 flere medarbejdere i virksomheden. Min tid i Digianswer varer ikke evigt, og jeg har en masse ideer, så på et eller andet tidspunkt bliver jeg selvstændig igen," siger Ole Jensen." (Nordhagen 2001a, p.7)

In this statement he argues, that he does not want to be CEO of Digianswer when it reaches 100 or 200 employee, because he is not an organizer. Does this mean that things were changing in the organization? The article illuminates a difference between Ole Jensen and a Motorola manager:

"... [OLE JENSEN] receives us in a corner office overlooking Nibe Bredning and Limfjorden, but it is not the kind of office, which the directors in the Motorola Group are otherwise entitled to. If the Director Jensen's office is 12 square meters, that is about it. "We just had a visit from one of the heads of division in Motorola, Bill Walker. He had bodyguards with him, and at home, he has an office the size of my house," says Ole Jensen without any kind of envy"

"...[OLE JENSEN] tager imod i et hjørnekontor med udsigt over Nibe Bredning og Limfjorden, men det er ikke den slags kontorer, som ellers tilkommer cheferne i Motorola-koncernen. Hvis direktør Jensens kontor er på 12 kvadratmeter, så er det vist det hele. "Vi har lige haft besøg af en af divisionscheferne i Motorola, Bill Walker. Han havde bodyguards med, og derhjemme har han et kontor på størrelse med mit hus," siger Ole Jensen uden nogen form for misundelse." (Nordhagen 2001a, p.7)

The 24th of April Nordjyske mentions in an article, that Digianswer has secured a deal which means that Digianswer will supply their Bluetooth Software Suite to Nokia, and this is the first time Digianswer sells software without accompanying electronics. The goal with this deal is, according to software development director Thomas Kjær Nielsen from Digianswer, that Digianswer hopes that their software can become a worldwide norm in the industry (Nordjyske.dk 2001a).

The 10th of May 2001 Computerworld runs an article about Bluetooth, and even though it is delayed, Bluetooth products are now starting to enter shops (Troelstrup 2001a). Six months earlier all Bluetooth products had been relying on technology from Digianswer, according to this article, but now chip producers such as Cambridge Silicon Radio, ST Microelectronics and Texas Instruments are also supplying Bluetooth chips. The Bluetooth activities in the region are also growing. In an article in Ingeniøren the 22th of June, about the presence of three new mobile-companies in Northern Jutland, Michael Bak, CEO of Cambridge Silicon Radios site, explains that CSR has created a Bluetooth solution that utilizes one CMOS chip instead of two chip, as competitors did (Krøyer 2001d). Furthermore, according to him, the pace in the industry has accelerated, since mass production started in September 2000 and by the start of May more than 1 million chips had already been produced. Interestingly, it is also stated that Michael Bak, before becoming CEO of CSR, was leading the Bluetooth development department at Digianswer.

The 17th of August 2001 Ingeniøren runs yet another article about Bluetooth, and again the message is that the Bluetooth industry is growing. According to this article the most significant companies supporting Bluetooth are Ericsson, 3Com, Agere, IBM, Intel, Microsoft, Motorola, Nokia,

Toshiba, and the following companies in Denmark are doing development work in relation to Bluetooth: Ericsson, Bluetags, Cambridge Silicon Radio, Digianswe , DWD, MPI Tech, Penell, RTX, TTPCom and Zucotto Wireless (Krøyer 2001c).

In the fall of 2001 Ole Madsen leaves his post as CEO of Digianswer, and Carsten Tiln, who is also an engineer by background takes over. In an article with the heading "The inventor spirit is threatened" (Opfinderånden er truet) published by Ingeniøren the 16th of November 2001, the new CEO Carsten Tiln argues, that the multinational corporations in Northern Jutland are not giving enough space for the good ideas of the engineers (Mathiessen 2001a). The article builds on an interview with Carsten Tiln, and contains some interesting points, where we can draw parallels to the TIDK case. The article says:

"The Northern Jutlandish inventor culture is being broken down. The engineers go from being the inventors who think wild thoughts, to become technology developers in large multinational corporations. We lose our edge, if the engineers up here do not again start to think innovatively and work with tomorrow's technology. The words come thoughtfully from Carsten Tiln, engineer and CEO of Digianswer in Nibe"

"Den nordjyske opfinderkultur er ved at blive nedbrudt. Ingeniørerne går fra at være opfindere, der tænker vilde tanker, til at blive teknologiudviklere i store multinationale selskaber. Vi mister vores forspring, hvis ikke ingeniørerne heroppe igen begynder at tænke innovativt og arbejde med fremtidens teknologi. Ordene kommer eftertænksomt fra Carsten Tiln, civilingeniør og administrerende direktør for Digianswer i Nibe." (Mathiessen 2001a, p.10)

Just as in the TIDK case, the acquisition by a large MNC gave some financial opportunities, in this case the ability to lend employees a Porsche, but it also meant that the focus of the company was narrowed down, from the production of "whole products" to pure R&D work in one specific technological area. Before the acquisition Digianswer produced whole products and took care of all the necessary steps in the value chain, as the article explains:

"... and mighty Motorola went on a buying spree in the small town on the edge of the Limfjord. And it has certainly provided new opportunities. In the small industrial district Digianswer appears as a streamlined pearl, and in front in the parking lot a red Porsche is parked for the use of the employee of the month. But at the same time the tasks have changed dramatically. Where the company before developing finished solutions for the end users, these days it is all about technology development. Previously, when we were a small company with 12 employees, it was about using technology to best solve problems for the user. Thereafter we would look at how you made the product an exciting business. We understood the market, got the ideas and developed the concept, remembers Carsten Tiln and mentions Digianswer's award-winning "Home Communications Centre", which a handful of engineers came up with on Christmas Eve 1993 over a bunch of beers. It was a piece of advanced consumer electronics with built-in voice recognition, electronic fax and digital answering machine"

"... og mægtige Motorola gik på virksomhedsopkøb i den lille by ved kanten af Limfjorden. Og det har bestemt givet nye muligheder. I det lille industri kvarter fremstår Digianswer som en strømlinet perle, og foran på parkeringspladsen holder en rød Porsche til fri afbenyttelse for månedens medarbejder. Men samtidig har arbejdsopgaverne ændret sig dramatisk. Hvor firmaet før udviklede færdige løsninger til slutbrugerne, drejer det sig i dag om at udvikle teknologi. Tidligere, da vi var et lille firma med 12 ansatte, handlede det om at udnytte teknologien, så den bedst muligt løste problemer for brugeren. Dernæst at se på hvordan man gjorde produktet til en spændende forretning. Vi forstod markedet, fik ideerne og udviklede konceptet, husker Carsten Tiln og nævner Digianswers prisbelønnede "Home Communications Centre", som en håndfuld ingeniører fandt på lille juleaften 1993 over en stribe øl. Der

var tale om et stykke avanceret forbrugerelektronik med indbygget stemmegenkendelse, elektronisk fax og digital telefonsvarer" (Mathiessen 2001a, p.10)

After the acquisition, focus was narrowed down to one technology and R&D work only:

"Today we no longer make finished products but the technological building blocks. Our tasks are narrowing. I experience it myself every day, and sadly many companies up here do. That makes the telecommunication industry in Northern Jutland vulnerable, he says, pointing at his own company that exclusively develops Bluetooth applications to OEMs (Original Equipment Manufacturer). We effectively work only with developing one specific technology. A Danish Board would never allow that. It's important to think ahead, so we can find the next exciting technology, he says, having earmarked 15 percent of the resources in Digianswer to longer term development of Bluetooth and wireless technology in general. We get permission from Motorola, so long as business is good. But when the crib one day is empty, it is probably the first place they will cut he assesses and recognizes that the development in some ways is natural enough. Digianswer force was and still is research and development - and not sales or marketing. But it makes us vulnerable, because we should be thinking further ahead. Somebody should get the good ideas. There are already too many who do Bluetooth and the elimination race is already underway, as we have seen with GSM and DECT, he says, and mentions RTX Telecom as one of the few companies in Northern Jutland, which stand out. RTX is in all the way from idea to marketing and concept development. That was the case for Digianswer too before being bought. Northern Jutland runs the risk of ending up with pure application development. I try to keep system and concept development in-house. For example, we also develop the software parts that make Bluetooth devices talk to each other, he says and brings the matter to a head: If we end up putting two chips together, we come into direct competition with companies in the East and they are tough and competition is top notch. Do we end up there, then we need to find the inventor. Engineers must add something new to the product"

"I dag laver vi ikke længere færdige produkter men teknologiske byggeklodser. Vores opgaver snævres ind. Jeg oplever det selv dag for dag, og det gælder desværre mange virksomheder heroppe. Det gør Nordjyllands telebranche sårbar, siger han, og peger på sit eget firma, der udelukkende udvikler Bluetooth-applikationer til OEM-kunder (Original Equipment Manufacturer). Vi arbejder reelt kun med at udvikle én bestemt teknologi. En dansk bestyrelse ville aldrig tillade det. Det er jo vigtigt at tænke frem, så vi kan finde den næste spændende teknologi, siger han, der øremærker 15 procent af ressourcerne i Digianswer til mere langsigtet udvikling af Bluetooth og trådløs teknologi generelt. Vi får lov til det af Motorola, så længe forretningen går godt. Men når krybben en dag er tom, er det nok det første sted, de skærer, vurderer han og erkender, at udviklingen på sin vis er naturlig nok. Digianswers force var og er jo forskning og udvikling - og hverken salg eller markedsføring. Men det gør os sårbare, fordi vi b tænke længere frem. Nogle skal få de gode ideer. Der er allerede alt for mange, der laver Bluetooth, og udskilningsløbet er allerede i gang, som vi har set det med GSM og Dect, siger han og nævner RTX Telecom, som en af de få nordjyske virksomheder, der skiller sig ud. RTX er med hele vejen fra idé over markedsføring og konceptudvikling. Der befandt Digianswer sig også inden opkøbet. Nordjylland risikerer at ende med ren applikationsudvikling. Jeg forsøger at bevare system- og konceptudviklingen her i huset. For eksempel ved at vi også udvikler de softwareklumper, der får Bluetooth-enhederne til at snakke sammen, fortæller han og sætter sagen på spidsen: Hvis vi ender med at sidde og sætte to chip sammen, kommer vi i direkte konkurrence med dem ude i Østen, og de er altså skrappe og konkurrencen er helt i top. Ender vi der, skal vi kunne finde opfinderen frem. Ingeniører skal tilføre produktet noget nyt" (Mathiessen 2001a, p.10)

This development is very similar to the development we saw in the TIDK case. First the acquired company is told that it will proceed with business as before the acquisition, and maintain its own culture, but over time the practices within the company are change anyway, because it has to fit into the multinational corporation. We should also see this interview, published in a national newspaper, as a sign that Carsten Tiln is not satisfied with the situation inside Digianswer,

or with the relationship between Motorola and Digianswer. It is also worth noticing here, that the manager from Digianswer places focus on the home centre as a piece of good technology. Technology is explicitly placed before business by the manager. We also saw above, that the home centre never made the company any significant profits, and that the production was therefore stopped after a few years. There are clear similarities to the discussion above about engineers and managers in the NorCOM cluster, who primarily focus on technology and technological quality and less on business.

In the latter part of 2001 large players in the wireless industry is starting to ease the throttle on their activities, as a result of the IT bubble. In an article in *Ingeniøren* the 16th of November 2001 it is argued that the mobile industry in Northern Jutland is breaking up (Krog & Mathiessen 2001). Large players are pulling out of the region or downsizing. Nokia Mobile Phones has left Aalborg, Siemens in Pandrup has fired 10% of its employees and Ericsson in Aalborg 25%. The GSM phone has created many jobs, but now the UMTS technology is entering the scene, and according to the article, UMTS development is not taking place in Denmark. An associated professor from AAU, Lars Arendt-Nielsen, argues in the article that some of the telecom companies are finding new paths, for example within the medico field. The article further explains, that first division in the mobile field is ruled by large companies such as Nokia, Motorola, Siemens and Ericsson, while the mobile firms in Northern Jutland, such as Maxon Telecom, Telital R&D Denmark and Shima Communcation is kept alive by mobile producers found in the 2nd and 3rd division of the industry. This is a problem, because the clear tendency in the market is, that producers becomes larger and larger, meaning that there will be no place for 2nd and 3rd division in the future. A consequence of the heightened competition is also that it is not possible for all the companies in the region to keep surviving on their GSM and Bluetooth competences:

"Jens Hald, CEO of Telital R & D Denmark, is among those who do not see the current competences as a constant resource. My concerns are 5-10 years in the future, but today Denmark has no competence building in UMTS, and we cannot all continue to live on GSM and Bluetooth. Although some companies will undoubtedly be able to do good business on Bluetooth, says Jens Hald. The position is confirmed by Carsten Tilm, the CEO of Digianswer that develops Bluetooth solutions: There are already too many who do Bluetooth and the elimination race is in full swing, as we have seen with GSM and DECT he explains"

"Jens Hald, administrerende direktør for Telital R&D Denmark, er blandt dem, der ikke ser de nuværende kompetencer som en vedvarende ressource. Min bekymring ligger 5-10 år ude i fremtiden, men i dag har Danmark ingen kompetenceopbygning på UMTS, og vi kan ikke alle sammen fortsætte med at leve af GSM og Bluetooth. Selv om nogle firmaer uden tvivl vil kunne lave en god forretning på Bluetooth, siger Jens Hald. Den holdning bekræfter Carsten Tilm, administrerende direktør for Digianswer, der udvikler Bluetooth-løsninger: Der er allerede alt for mange, der laver Bluetooth, og udskilningsløbet er i fuld gang, som vi har set det med GSM og DECT, forklarer han." (Krog & Mathiessen 2001, p.1)

Digianswer however, stays a key player in the Bluetooth field. In an *Ingeniøren* article the 7th of December 2001, Digianswer is mentioned as being one of the "spearheads" in Denmark within Bluetooth technology, and it is stated that though Motorola's ownership Digianswer is part of the inner circle of the Bluetooth-SIG (Special Interest Group) (Krøyer 2001b).

An article in *Jyllands Posten* the 11th of February 2002 mentions that there has been a change in the management of Digianswer, Peter Shinyeda, Ole Nørgaard Jensen and John E Steadman have left the board, and William Joseph Dunnigan, Dennis Nobert Griot and John Nielsen Palle have joined the board. Already the 18th of February the same newspaper announces that William Joseph Dunnigan has left the board of Digianswer, after little less than a month in the role and Thierry Cammal replaces him.

Through 2002 and 2003 Digianswer is not mentioned much in the media, only sometimes in relation to Ole Jensen, who became a millionaire by selling Digianswer, and who is now entering the nanotechnology field.

The next big headline in which Digianswer takes centre stage comes in January 12th, 2004, in Berlingske Tidendes Nyhedsmagasin, and the heading is “Digianswer in the dangerzone” (Digianswer i farezonen) (Kjær 2004). The article explains that the company reached a size of 120 employees, but that the future has been uncertain since the takeover by Motorola. First the founder Ole Jensen left, and then downsizing occurred, so that the company now has 47 employees left. Furthermore, just before Christmas 2003, Motorola moved the administrative CEO Carsten Tilm to a new job in USA.

April the 28th 2004 Berlingske Tidende runs an article which says that Carsten Tilm has left the board of directors of Digianswer, Dennis Nobert Griot and Ole Høeg Niss have left the board of the company, and Thierry Cammal, Kurt Andersen and Alan Campbell have entered the management of the company (Berlingske Tidende 2004).

In the summer of 2004 Motorola spins-off its semiconductor activities into the company Freescale Semiconductor (Jp.dk 2004). This influences Digianswer which becomes part of Freescale Semiconductor.

Kurt Andersen is now the administrative CEO, and became this the 1st of Marts, according to an article dated the 26th of July 2004 in Erhvervsbladet, and is dealing with cut downs in Digianswer (Erhvervsbladet.dk 2004a). The company now has around 50 employees, and Kurt Andersen explains the reason for the cut backs in 2003 as the fact that Digianswer is not producing products for consumers anymore. Due to the cut backs Digianswer is not using all of its buildings anymore. The article further explains that Carsten Tilm has gotten an international top position in Freescale Semiconductor. The article also explains that the strategy has been changed. Now the company has become involved in other wireless technologies besides Bluetooth, for example Zigbee and DVB-H. Therefore, Kurt Andersen argues, the company will probably hire 10-15 people shortly.

The media is then relatively silent about Digianswer for a while. It is mentioned a few times, but only in relation to Ole Jensen and his activities in Nanotechnology. Finally, in 2007, Digianswer is closed. The important thing to note from the story of Digianswer is the similarities to the course of events we saw unfolding in TIDK. First the people in the acquired company are told that they can continue work in the same way as before the acquisition, and maintains their own approach to the work. However, over time the practices of the people in the company are change anyway, because they have to fit into the multinational corporation, which in turn leads to frustrations among the people in the company. Another issue is that the first product, the Home Communication Centre, which was presented as the core of the company in the early years never made any significant profits for the company, we may reflect on this in relation to the discussion about the lack of business capabilities above. With this in mind, let us now turn to the final discussion in the next chapter.

Chapter 9: Discussion

Chapter 6 and 7 have analysed how TIDK's employees were constructed, how they had a different approach to their work than the rest of the TI organization, and what characterized this approach. Chapter 8 has analyzed how the NorCOM cluster was constructed through different events, discourses and practices, over time. This chapter will now discuss this analysis, and focus will be on two issues. Firstly section 9.1 and 9.2 will analyse and discuss the results from the two stories above. As will be argued below, it is possible to create a more elaborate understanding of the discourses and practices through which the people in TIDK were constructed, by conducting an archaeological analysis of the discourses and practices identified in the analysis of TIDK and the analysis of NorCOM. Section 9.1 will therefore present such an analysis, and section 9.2 will thereafter summarize the discussion into a number of problematizations.

Since this thesis represents a new approach to cluster studies it is also important to return to the conventional cluster literature and discuss what the approach of this thesis can do compared to the approaches and theories in the conventional literature, and what the implications of the results of the analysis in this thesis are, in relation to the conventional cluster literature. This will be the focus of section 9.3.

9.1 An archaeological analysis of the TIDK story and the NorCOM story

Given the discussion in the second part of the thesis about Foucault's approaches to science, and the phronetic approach to social science, one way of summarizing what social science is about is, that it is about creating better explanations of the problematizations with which the research deals. As argued, this thesis is about identifying, analyzing and describing the problematizations, through which people in TIDK in the NorCOM cluster were constructed as subjects in relation to their work in TIDK, an organization located in the NorCOM cluster. In other words, it is about investigating the discourses and practices which make it possible to discuss such workers and their behaviour in relation to their work, and what characterizes these workers and their behaviour. It is, to use Foucault's way of framing the issue, to investigate the discourses and practises, which make these subjects enter into the game of true and false, in relation to their work, as subjects who do their work right or wrong, as objects which we can discuss.

The previous analysis has investigated this in relation to TIDK, how the employees were constructed through all the changes in practices, for example in relation to the technologies they worked with, the market they supplied solutions to, the way in which the work of the engineers were structured as well as the way in which management practices changed over time; as well as in relation to discourses, which were illuminated through this focus on practices. We saw this in the way people in TIDK, by the end of the TIDK story, articulated themselves as different from other TI employees, and were also articulated as such by employees in other places in TI. We also saw this through the interview quotes where, for example the manager coming from the outside told how discussions would be ongoing about where to go within TIDK, but nothing was done about it in the larger political game within TI. Or how people from TIDK talked to each other but did not talk a lot to people at other TI sites.

However, when reflecting on this story, and going back and forth through the empiric data, one gets the feeling that two pieces of the puzzle are missing. First, the story of changes in TIDK can be seen, if we are a bit crude in our interpretation, as the story of an organization which experiences a number of changes all pointing in one direction, i.e. away from a focus on technological quality as the goal, and towards a focus on delivering something that was "good enough" given

the time and resources available and towards paying more attention to the political game and the issue of positioning themselves within the TI organization, which, as it also dawned on the employees in TIDK towards the end of the story, was extremely important. **The first question** one is left with, having gone over this story is thus: how come the people in TIDK did not change faster than they did? How come they did not accept the new rules of the game? How did they maintain their focus on technological quality? **Second, one is also left with the question:** Where did this focus on technology emerge? It seems that it was already present in the ATL Research days, but if one is a bit curious, one cannot help thinking: was this just something which characterized ATL Research, or has it something to do with the NorCOM cluster. And even if it was just something that characterized ATL Research, where did it come from? How did it emerge? And in relation to the first question, was the localization in the NorCOM cluster maybe part of the reason why the focus stayed on technology?

To answer these questions, we have to bring in the story of the NorCOM cluster into our consideration to interpret how this happened, or rather, how the changes did not happen. Let me here go back to the issue of interpretation. In analyzing the problematizations through which the employees in TIDK are constructed as subjects in relation to the work, with a specific view of themselves as workers, and a specific understanding of right and wrong in relation to their work, the issue of interpretation becomes fundamental. The only way to create such problematizations, using the phronetic approach to science, is to present the better interpretation of the discourses and practices which made the employees the subjects they were in relation to their work, and makes it possible to discuss their characteristics and behaviours in relation to this. And clearly, the analysis of such problematizations is not finished, if one is left with these two questions, which is first, how come the employees did not change their approach to the work when so many things pointed in the direction of doing so? Second, how did their special focus on technology and quality emerge? The interpretation of the discourses and practices lacks something when these questions are unanswered. And this is why the analysis of the NorCOM cluster is a needed part of the analysis in this thesis, because, this analysis carries insights which make it possible to close these holes in the interpretation of how TIDK employees were constructed as subjects in relation to their work.

To do so, it is now time to combine the insights from the story of TIDK and the story of the NorCOM cluster and thereby investigate how TIDK and NorCOM are tied together through the same discourses and practices, and thus make a "better interpretation" of the events, the discourses and practices, which gave rise to the problematizations, i.e. the very fact that it is possible to discuss the employees in TIDK as subjects in relation to their work.

How does one investigate how certain discourses and practices reoccurred in both the two complex stories, without just repeating them? To do so, I took as my point of departure the archaeological method. Instead of grouping the discourses and practices mentioned in the two stories in relation to which stories they were part of, i.e. whether they were from the TIDK analysis or whether they were from the NorCOM analysis, I mixed the discourses and practices from the two stories to see if it was possible to create an overview, which could give a better understanding of the two stories and the relationship between them. To understand what I did and why, let me go back to the discussion in part II of this thesis. Foucault argued in relation to genealogy

"One is led therefore to the project of a pure description of discursive events as the horizon for the search for the unities that form within it" (Foucault 1972, p.29-30)

I started by going through the two stories in detail, identifying each discourse or practice, which was mentioned in them. Having identified all the discourses and practices, I started to analyze them by trying to map them, and place them in relation to each other; to see whether certain

relationships formed between them or any structures emerged, or to use Foucault's terms above, to analyse whether certain unities formed within them. By arranging the discourses and practices, which had a functional relationship with each other close to each other, gradually a map showing different groups of discourses and practices started to emerge. Certain discourses and practices could be grouped together under certain "themes" or "issues". Looking at the layout, it emerged that there was a core to the story, aspects of which could be found in both the TIDK story and the NorCOM story. Growing from this core was a number of themes containing discourses and practices, which could be found in both stories. What I identified using this method was thus discursive formations, which Foucault as mentioned earlier defined as:

"Whenever one can describe, between a number of statements, such a system of dispersion, whenever, between objects, types of statement, concepts, or thematic choices, one can define a regularity (an order, correlations, positions and functionings, transformations), we will say, for sake of convenience, that we are dealing with a *discursive formation*" (Foucault 1972, p.41-42)

What I will do is thus to identify discursive formations shaping TIDK and the NorCOM cluster, from the combination of the two stories in this chapter. It is not to repeat the NorCOM story in more detail using the TIDK story as input, or vice versa, to repeat the TIDK story in more detail using the NorCOM story as input. It is instead to tell a third story, using the idea from Foucault's archaeology as the methodology, which is to construct a story on the insights from the two previous stories, and as such a story which holds more richness in its account of what made the people in TIDK located in the NorCOM cluster, the people they were in relation to their work. I will structure the presentation so that I first present the different formations of the discourses and practices in the following subsections, and then in section 9.2 I summarize and present the core which is a number of problematizations at the core of both stories. Thus the following subsections dealing with the discursive formations that influenced the way in which the people in TIDK were constructed as subjects as well as the discussions of the problematizations which lay at the core of this in section 9.2 constitute the answer to the research question.

9.1.1 Technological reason for the move into the wireless industry in the region

The first theme we should explore from the two stories is the technological basis for the wireless industry in Northern Jutland, or in other words, the discursive formation of discourses dealing with the basis for the industry. We saw in the NorCOM case, how the first big companies in the cluster, Dancall and Cetelco, made the move into the mobile phone industry out of technological reasons and the possibility of expansion. They were producing maritime navigation and communication equipment, and given the fact that the mobile market was taking off, and they already possessed the technological capabilities and the production facilities to produce mobile phones, they joined this market.

An interesting thing to note in relation to the TIDK story is that apparently ATL Research also ended with a focus on GSM customers because this was both the easiest seen from a business standpoint and also the choice which fitted the existing practices the best. The argument that the GSM customers were large and knew the wireless field whereas customers from other markets were smaller and more difficult to work with due to them being unfamiliar with the wireless field suggest that the decision to stay with the GSM knowledge could be a move made because it minimised the need for business competences, understood as the ability to grow customers in markets unfamiliar with wireless technology, and hence with selling wireless technology. The GSM technology at the time almost sold itself, as the story of TIDK showed, by illuminating how ATL Research had been contacted by customers who had heard about ATL Researches capabilities within GSM. Furthermore, and also important to mention, we saw in the NorCOM case how discourses around the GSM competence and the capabilities of the NorCOM cluster also emerged

in the 1990s, and these discourses pointing towards choosing GSM as the main business area have most likely also been a factor in the choice.

We also saw in the NorCOM case, how the companies that made the move into the market lacked business capabilities, understood as the marketing capabilities as well as the organizational capabilities to navigate in the fast moving mobile market. As the technology developed, they were therefore losing money, and also lacked the size necessary to compete. The only way that lay open to the companies, in this situation, was therefore to be acquired by MNCs. This leads to the second discursive formation forming, and this is a discursive formation dealing with the situation within MNC subsidiaries in the cluster.

9.1.2 The situation within MNCs

After the companies in the cluster had made the move into the wireless industry, and been acquired by MNCs, how was the situation within these subsidiary organizations? We saw in TIDK, that the people within this organization found themselves in a situation where there was a political game around work tasks and competences. To maintain a position as part of TI, people TIDK had to engage in a political game around new competences and new work tasks to continually position themselves as an important part of the TI organization, while the technology, the market, as well as TI, and its customers, and suppliers continually changed. This also meant, as we saw in TIDK, that the people in TIDK had to learn to participate in the political game.

We saw in the NorCOM story, that this dynamic of involvement in political games within MNCs apparently was an issue experienced by all the subsidiaries in the cluster, because towards the late 90s the managers in the subsidiaries started discussing in the NorCOM association how they could gain, or regain, some influence within the multinational organizations of which they were part.

How fast this situation emerged within the subsidiaries seems to have been different among the subsidiaries, and some subsidiaries did apparently not live long enough to experience the pressure from political games within the MNCs as much as TIDK did. We saw in the TIDK case that a number of years passed from the acquisition to the phase where the crystal reorganization came, and changes in the market, the industry, in TI, among the customers and among suppliers meant that the work practices among the engineers and managers changed from no rules to tight planning, to put it simply. We saw in the account of the NorCOM association that Ericsson was acquired but apparently due to the relatively short history of Ericsson in the NorCOM cluster this organization never reached a state where it had to fit into a larger organization in the latter part of the GSM lifecycle with the demands this put on the R&D work, and the employees therefore newer saw this pressure to fit in as something frustrating, as they did in the TIDK case. But just as the managers in TIDK started feeling the heat of the game within TI shortly after the successful first years of the acquisition, so did the top manager in Ericsson feel the pressure and the struggle for influence. The analysis of Digianswer shows that this was apparently also a case of a local organization, with a special local culture described as far from the American culture, for example in relation to "management offices", being acquired. Less than one year later the founder leaves and the articles make it plausible to conclude that this was also due to his dissatisfaction with the situation within the MNC. The analysis of Digianswer showed how the people in Digianswer were told at the time of the acquisition that they could keep their own approach to the work and that they would not be forced to fit into the big Motorola organization. However, later they had to, and we saw this causing irritation among the people in Digianswer, exemplified by the critical statements made by their CEO in the media.

So what happens is apparently that we have a number of companies which are acquired, and which, sooner or later, realized that there are a difference between being a local company who supplies technology to other companies, and being a subsidiary of a large multinational organization, in as much as this demands certain capabilities in relation to political games etc. It also seems that what intensify these games across the companies were the changes in technology, and mainly the GSM technology, which matured, and the changes this brings in relation to the market and the configuration of the wireless industry.

It is important to put a few more aspects to this change, which happened across the cluster in the 1990s where the majority of the companies became MNC subsidiaries, because with these changes focus is placed on politics in organizations. In some of the newspaper articles dealing with the NorCOM cluster, it was argued, as the NorCOM story shows that the MNCs had the competences in relation to marketing and business and organization, which the smaller NorCOM organizations did not have. Therefore the competences of the MNCs were seen as complementary in the articles, in as much that the MNCs had the competences, which the local companies did not have. Therefore it was argued, that through the acquisitions the local organizations would be strengthened, since the local organizations possessed the technological knowledge while the MNCs had supplementary knowledge in relation to for example marketing. And therefore the problems of lacking business and marketing knowledge in the cluster would disappear. What the analyses of TIDK and NorCOM show together is, however, that while the MNCs had such complementary assets, the local companies also needed new competences to function as part of MNCs. More specifically, they had to be engaged in political games, and the workers in the NorCOM organizations needed to learn how to participate in such games, how arguments were constructed etc.

To understand how a situation emerged, where the people in the companies maintained their approach to the work, i.e. the question I started this chapter with, we have to look in more detail at what the two stories say about being part of an MNC versus starting a small local spin-off.

9.1.3 Being a small start-ups versus being an MNC subsidiary

When looking at the two stories two interesting points emerge, on the one hand the MNCs are seen by the local people in the NorCOM cluster as saviours, or if that is too blunt, at least as organizations which made it possible for the engineers in the NorCOM cluster to keep working within the mobile industry. They possessed the size necessary to compete in the wireless market, and they possessed the competences in relation to marketing etc. that the NorCOM companies were missing. This was partly why the recipe for success in the 1990s became to be acquired by an MNC. As we saw in the TIDK case, the founders of ATL Research who sold the company to TI was aware that ATL Research might have been able to survive for another year as an individual company, but then it would have died, had it not been acquired, due to the development of the technology and the structure of the wireless industry.

But although the acquisition of an MNC thus was something to strive for, being part of an MNC as an R&D subsidiary also had its challenges. And these were the issues the study of TIDK illuminated in relation to participate in political games, networking, and the company's position within the MNC etc. All of which the story of TIDK showed were seen by the majority of the employees, engineers as well as managers, as something distracting from their real work which they believed to be development of high quality technology. Or put more precisely, the employees had been constructed as workers through discourses within the NorCOM cluster, which the story of NorCOM illuminated in details, which meant that they themselves understood technological work as the core of their work as employees in TIDK or more broadly as employees in the

NorCOM cluster. Their job was to develop high quality technology; it was not to participate in political games, do networking within MNC organizations etc..

So the people in the cluster, given the way in which they were constructed as subjects in relation to their work within the mobile industry, found it difficult to function as part of MNCs, and still they could not live without the MNCs, as workers in that industry. They were thus caught in a complex relationship with the MNCs; where the MNCs at the same time could be part of an 'us' in the NorCOM, an 'us' that lived through the presence of large MNCs and compete as MNC subsidiaries against other institutions and organizations as discussed in the story of NorCOM in the discussion of the relationship to IT Forum etc, and also at the same time the MNCs constituted a 'them', an organization with employees in other localities around the world, who had a different understand of what their work was about, and thus were different from the local 'us' inside the NorCOM cluster in relation to work. This complex relationship is part of the core of the story; so let me elaborate a bit.

There were thus three different 'us's' constituted in the NorCOM cluster over time, as the two stories show. The first 'us' was an early 'us' in the NorCOM cluster, a unity existing among the companies and their employees, which was created in the late 1980s and early 1990s where companies and thus employees were joined together in a unity through a struggle against the large players in the industry to make a GSM phone. This was the phase where a personal network also emerged in the telecommunication industry in the region, among people working together at Dancall, Cetelco or DC Development, who would later become engineers and managers in different companies throughout the cluster. A network which survived to the very end, where it according to critical views of the character of the NorCOM association became what tied the association together in the final years, where the association could partially be described as a coffee-club for old friends in the industry. This was one 'us' in the cluster, an early one, which was formed in the struggle against the MNCs outside.

As MNCs entered the cluster, and people in this 'us' became part of the MNCs, and the MNCs thus became a part of this 'us', the 'us' changed character. The focus on technology, quality and helping each other, which had emerged around DC Development and NOVI in the late 1980s and early 1990s stayed with the people in the network, and the way in which they had been constructed as workers in the telecommunication industry in the 1980s and through the discourses in the 1990s meant, that for them the right thing to do, in relation to their work, was to focus on technology, quality and helping each other. This was what a good telecommunication worker did, in their mind. And with this approach to their work, or in other words, by being constructed as such workers, the employees in the NorCOM cluster also saw themselves as an 'us' united across the MNC subsidiaries through their joint history and similar approach to their work, an 'us' which were different than the 'them' the employees were working with in other places in the MNCs. For example in TIDK the employees in TIDK saw themselves as an 'us' in relation to a 'them' in the other TI sites who had different approaches to the work.

At the same time there were also an 'us' in the NorCOM cluster which was the collection of companies, most of which were MNC subsidiaries, which were united in a struggle against other institutions and organizations in the region. This was the unity among all managers in the NorCOM association, of which most were MNC subsidiary managers, who were struggling to support the university and obtain funding for telecommunication research as well as to attract engineers to the region to support their own positions within the MNCs. There were all in all these three 'us's' in the story, and the MNCs were at the same time part of an 'us' in relation to positioning and promotion of the NorCOM association as well as a 'them' in relation to how work ought to be done.

We could also reformulate this problematique of MNCs being both an 'us' and a 'them', because, as we saw, throughout the 1990s the recipe for success in the cluster became to create technology of a high quality standard, and then be acquired by an MNC. This means that small start-ups became both a way of avoiding having to grow and perform as a local firm, but also a way of avoiding the situation within the MNCs. When the situation became too frustrating, and a certain stress limit was reached, the engineers or managers would apparently start their own companies, as we saw in the case of ATL Research, to avoid the political games etc. within the larger organizations. And when this step was taken, the next step was to be acquired by an MNC, "again" one might add in a bracket. This of course had a close relationship to the fact that business was understood in a special way in the cluster as discussed above, and the recipe for success was to make high quality technology, which would be acquired. We could in this regard note, that in the story of TIDK we saw, that the reason why the founders of ATL Research left Cetelco was exactly the result of being part of an MNC. They felt that headquarter changed plans endlessly, that they could not control where the company was moving, and that it was not moving in the right direction. Interestingly, it is basically the same story we saw unfolding years later in TIDK, where one of the managers decided to leave partly because of the political game.

It thus appears that people in the cluster, due to the discourses and practices emerging through the late 1980s and early 1990s believed that technology of a high level would sell itself so to say, that the MNCs acquired the local companies due to their technological competences and that they then would be part of the MNCs because of technological capabilities. The situation, which emerged, was however, that the people in the acquired organizations had to continually struggle to gain a *raison d'être* within the MNCs. What the case study of TIDK clearly shows is that the technology was not selling itself within the TI organization. People in TIDK had to engage in political games about tasks and competences to create a *raison d'être* within the TI organization.

So what is the picture emerging here? It is the first problematization in a series of problematizations I will explore in this chapter, or in other words, a series of problematizations which exists in relation to one another, and as such given each other a basis. This first problematization is that apparently the organizations in the cluster could not live on their own for a number of reasons. However, the organizations within the cluster also found it difficult to live as subsidiaries of MNCs. They got their life through being subsidiaries, but due to the specific way in which people in the NorCOM cluster had been constructed as workers, i.e. through the discourses around the NorCOM cluster, the people in the organizations in the NorCOM cluster also found it difficult to participate in the political games and find a place to occupy and develop as part of large MNC organizations, as explored in detail in the TIDK case. We see thus a tension between the two states, i.e. being a local company and being an MNC subsidiary, and we can only understand the issues inherent in one state when it is understood in relation to the other.

But how did this problematization emerge, how come the people in TIDK did not adapt to the changing context and learn the political game faster and learn that other agendas than technological quality was important, as I asked above? How come they did not develop the business and marketing capabilities, which would have made them better suited to exploring niche markets as small local companies? This has to do with the way in which the people in the NorCOM cluster were constructed as subjects who had a specific understanding of how to do their job, through discourses and practices within the NorCOM cluster.

As argued in the NorCOM story, according to the discourses in the cluster, the engineers in the NorCOM cluster changed the world – they were part of a revolution by bringing the mobile phone to the masses, as mentioned in for example several articles dealing with DC Development. However, a picture also emerged of a cluster of people who apparently were slow to change themselves. Apparently, there were something which seemed as a lack of drive to change things

in the cluster, some would even call it a laziness, and it seems that the reason why this was the case, and thus why people in TIDK were so slow in changing and adapting to the situation within TI has to do with the articulation of success stories within the cluster.

Very roughly put; and I will elaborate on this below, what started out as promotion of the NorCOM cluster, turned into a joint history, which in turn meant that people in the cluster partly started building their identity on promotion stories, which articulated all the good aspects of the cluster but were rather silent on the weaknesses. And this meant that people in the cluster rarely addressed their own weaknesses. Instead of adapting, the practice of being acquired and then later starting new companies seems to have been a way of coping with the situation and maintaining the focus on technology and quality, instead of changing the approach to the work. And what caused this was a belief among the people in the cluster, that they were the best.

9.1.4 Limited drive among people in the cluster for other things than technique

There are numerous points in the story of TIDK, which can be interpreted as employees in TIDK was lacking drive in their work, or to put it more critically, were being lazy. But my point here is that the people in the NorCOM was in fact not lazy, and they did not lack drive, the situation was, that they had drive in some specific directions, so to say, which meant that when observed by people from the outside, they seemed to lack drive. Let me frame this by firstly looking at the things that from the outside seemed to indicate a lack of drive, and thereafter reinterpret these issues.

There was the fact that engineers in TIDK were not well-connected to other TI sites. They were, as we saw, not even well-connected inside TIDK, they did not talk much to each other inside TIDK either. This is illustrated for example by the fact that a manager from TI Nice explained how he had to call two people in TIDK who shared an office, to make sure that the two were talking together. It is also showed by the fact that micro management was necessary within TIDK, and that one top manager in TIDK directly said that he thought people in TIDK were too lazy. It is also shown by the initiatives, which never became anything. We saw how one manager explained that TIDK had never been capable of creating synergy between the groups in TIDK, although he explained this as being due to external decisions. We also saw how a manager in TIDK said, that he had often thought about doing something to strengthen the flow of information from TI Nice to TIDK but that nothing had ever come of it. We also saw that while the engineers were given a percentage of their working time to work on competence groups, the groups died out anyway. We also saw how some people in TIDK thought that they had not stood firmly enough on their tasks in the political games. And in relation to the political game, we also saw that people from other TI sites thought that people in TIDK had reacted too slowly, according to the views from TI Nice, people in TIDK had not been aggressive enough at the start of the conflicts resulting in them loosing. Seen from management above TIDK, TIDK had lacked leadership. The fact that drive was apparently missing is also shown in the fact that the top management of TIDK found that TIDK had become an execution site towards the end of its life. Assignments would come from outside TIDK, people in TIDK would accept them without questioning them, and then they would execute them, and go home again.

This long list of points may be taken to indicate that people in TIDK were lazy or less aggressive or less active than people in other parts of TI. However, if we put these points in perspective in relation to the analysis of the NorCOM cluster, and the discourses and practices in this, another picture emerges, which is that the people in TIDK were active in some very specific areas, or directions, which means, that people looking at TIDK from the outside might get the impression that in other directions, the people were lacking drive.

We saw throughout the analysis of the NorCOM cluster, that the companies in the cluster possessed some special GSM competences in the 1990s, and that many MNCs entered the cluster because of these competences. And this was also the basis for the success stories about the NorCOM cluster; its successful companies, and not least its talented employees, who launched a technological revolution according to some articles. We also saw in the NorCOM story how a joint history was created through for example newspaper articles in the later part of the 1990s, where the cluster was presented as a success of fairytale proportions and the people in the cluster was constructed as being special. So one thing is, that they were apparently good at GSM when they were acquired, which was maybe why they were acquired, remember the point made about the high demand for engineers at the time, but more importantly, they were also too good at telling themselves that they were special and great. It therefore emerges, that the success stories, which partly started out as promotion of technological capabilities and of the NorCOM cluster in the mid 1990s, therefore not only meant that niche markets were overlooked and focus among the companies were narrowed to a focus on the jump from 2G to 3G. It also meant that in the conception of how to do their work, the people in NorCOM became rather stuck, as the horizon of the people became narrowed to some very specific approaches to their work.

These persons were told they were the best and that they were special, many times, and they told each other this too. And they believed in it. And therefore it was “natural” for them to maintain the same attitude towards their work. In case of people from other places around the world telling them otherwise, they believed that it was the ‘other’ people who had misunderstood the situation. And this was what we saw happening in the TIDK case on two dimensions. On the one hand in relation to the actual work tasks and competences; and on the other hand in relation to the interaction, or lack of the same, with other TI sites.

The GSM RF area was the core in TIDK, just as it was in the NorCOM cluster, and this was cemented through the discourses we saw in the analysis of the NorCOM cluster. This explains why TIDK people were seen as being rigid in their GSM focus, and why they stayed relatively focused on what they could do, instead of looking into new areas which were opening up inside TI. In other words, what might have appeared to other people in TI as a lack of drive to explore and occupy new work areas, was, seen from TIDK, a rational focus on GSM as TIDK’s core area, because the discourses in the NorCOM cluster had constructed the employees in TIDK in a way, so that faced with the decision to focus resources on the core area or use resources to explore new areas, they would choose the former option.

The discourses about success and being the best in the NorCOM cluster were also what influenced the TIDK people’s behaviour in their interaction with other sites in TI, which made them appear lazy or less aggressive than others. Instead of engaging in discussions around technology, networking, participating in political games etc., people in TIDK had their own view of things, and if people in other TI sites disagreed, then it was their problem. And TIDK people did not engage in discussions to convince the others in such cases, it was just their problem that they could not see, that the people in TIDK were right, as the story of TIDK showed. The lacking of networking activities is also rational given the discourses in the cluster which made the people in the cluster focus on technology, because, there were only a certain number of hours available for the engineers to do their work in, and as they believed that their most important task, as a good worker in TIDK in the NorCOM cluster, was to produce technology of a high quality standard, they devoted their time and resources to this end. The wisdom among the people were, that if the technology had a high enough quality, it would sell itself, also within the organization, and as such it was a rational decision to focus all resources on technology development, which would render networking and political games unnecessary. If the technology was good enough, other people in TI would see this, and realize how important TIDK was. This meant that networking with other TI sites was less in focus than it was in other TI sites, which in turn meant

that people from TIDK appeared to be rather inwards looking when observed from other TI sites.

So what happened was in other words, that the discourses about the NorCOM companies and their employees being special and successful meant that people in the organizations became less willing to change, and stuck to their own way of approaching the work. Even as part of an MNC organization in which many dynamics pointed towards a change in the approach to work. And this meant that from the outside TIDK people might have appeared to be lacking drive or even be lazy, but what happened inside TIDK was that people focused their energy on technology in some rather specific areas, because of specific discourses in the NorCOM cluster. And also because of these specific discourses, they spent most of their energy on technology development and less on networking etc., and this meant that from a managerial perspective micromanagement was necessary.

This is interesting, because a self-understanding we saw in the TIDK case, was that people in TIDK they saw themselves as humble compared to others. They said that they had a Northern Jutland mentality, so that they would not go out into the TI organization and shout about what they could do, and make a lot of noise. We also saw, however, that they were very proud of their work. So what emerges is a finding, which is that apparently the TIDK was not exactly humble in relation to their work. They might have been rather quiet about how good they were, but in their own self-understanding they were the best, and that even to a level where they did not even see it as necessary to engage in discussions with other people in TI to show this. This is also shown in the analysis of the political games where we saw that people in TIDK did not react fast because they saw themselves as the experts. This attitude towards the work can hardly be understood as humble. This also means in relation to political games, that people in TIDK did play the game within the TI organization, but they played it their own way. They believed that technology of a high level would sell itself, so to say, and therefore by creating technology of a high level they would secure a *raison d'être* within TI. Their move in the political game was thus to choose technology and quality instead of engaging in networking and politics to the same extent as TI Nice and TI Dallas apparently did. So people in TIDK played the game, but they played it their own way, and this was as the analysis shows a way which resulted limited success within the TI organization.

Therefore let us not turn to the creation of the success story, which not only meant that people in the NorCOM cluster developed a special understanding of business, as explored in the NorCOM story, but also saw themselves as being humble, while their actions can hardly be described as humble, and also stuck to their own approach to their work in the face of pressure to change from the outside. In other words, if one believes that one is the best at something, why should one then change just because other people who are less good tells one to do so?

9.1.5 Success history created around NorCOM

We saw in the NorCOM story, that DC Development became the thing that tied the cluster together throughout the 1990s and the 2000s. After the first local companies in the cluster had become too small to compete with the larger players, and also since they lacked certain competence to be able to compete in relation to for example marketing, what happened was that people left these companies and started their own small companies. These companies were in turn acquired by MNCs throughout the 1990s and early 2000s. And we saw how the cluster, at the same time became articulated as a success story in the media, and what tied these companies together in a unity was their joint heritage and the work area.

As the success story emerged, what happened was at the same time that problems and weaknesses were articulated as something external to the NorCOM cluster. The reason why Dancall did not become Nokia was due to a lack of venture capital in Denmark; it was thus not the fault of the people in the cluster, who possessed the technological competences, it was the fault of venture capitalists outside the cluster. We also saw the same view on problems as something external in the TIDK case, for example in the discussion of the lack of synergies between different parts of the TIDK organization, which was described as being due to external decisions which ruined the synergy. If one take a critical view of the cluster, one could also argue, that these issues were due to weaknesses in the cluster, i.e. people in the cluster not being able to convince venture capitalists to invest in the cluster and people in TIDK not being able to create an organizational situation within TI and TIDK which ensured synergies. The point is that these facts could also be interpreted as showing weaknesses among the people in the NorCOM cluster, but they were not, they were instead, as the analysis shows, explained as something external to the cluster. And this is important, because what developed were discourses about the successes and the technological competences of the NorCOM cluster and its people as something internal, the successes of the 'us' within the cluster. And at the same time weaknesses were articulated in discourses as due to external issues, the problems were due to an external 'them'. In other words, people in the NorCOM cluster and their organizations were successful; problems were due to external issues.

The success stories about the NorCOM cluster and its people were intensified and thus hardened over time due to the technological development and the relationships between the NorCOM association and other organizations in the region. When GSM had been articulated as the core of the cluster, and as such discursively made into the core of the cluster throughout the 1990s, and the discussion emerged in the late 1990s about what should come after GSM, the natural thing to do was, as seen by people in the NorCOM cluster, because of the discourses and practices surrounding them, to focus on making the jump from 2G to 3G technology. And this jump demanded that people in the NorCOM association gathered resources to building new telecommunication competences in the region. This meant, as the story showed, that what happened was that instead of opening up towards for example the IT environment, people in NorCOM stood even more firmly on being telecommunication only, and thus the struggle with for example IT forum emerged. To lift the challenge a professionalization of the NorCOM association also occurred, and the love-hate relationship with the local university thus intensified. These local struggles had the effect of sharpening the boundaries of the NorCOM association even more, and thus also that NorCOM people became more isolated from other people in the region. The success stories and the distinction between a successful 'us' and an external 'them' that problems related to, meant that weaknesses in the NorCOM association were something which was rarely addressed. People talked about what they were good at, but not much about what they were less good at.

As such the success stories as well as the struggle with other institutions and organizations meant that people in the NorCOM cluster became rather stuck in their way of thinking. They saw themselves as the best, as argued above, because this was what the discourse had made them. They were, as the TIDK story showed very proud of their work and confident in their work to the extent that they did not even engage in discussions with people who thought otherwise.

What is important to realize about the success stories, which came to characterize the NorCOM cluster throughout the 1990s, were that they were stories, which were constructed through discourses. Of course there are facts showing, that along certain dimensions, the cluster had been what we may term successful. GSM phones were developed and companies were acquired by MNCs. But success, the very term success, is also a construction. Something becomes a success in discourses through being articulated as such. And in the NorCOM story we saw how a group of actors in the wireless environment in Northern Jutland all saw an advantage in articulating the

industry as a cluster, as the NorCOM cluster, after the cluster concept and its strengths were planted in the environment by especially Bent Dalum from the business department at AAU.

When the cluster concept was taken up, and used as the basis for the NorCOM cluster association, and articulated in the media, first in what can be regarded as a series of promotional articles, and later in articles which told the story of a success of fairytale proportions. Then it comes as no surprise, that this mixture of a concept which people saw as an advantage in promotion, and stories in the media which in certain cases had the objective of promotion, resulted in discourses which placed emphasis on positive aspects of the NorCOM cluster and which were relatively silent about the weaker sides of the cluster.

The discourse in other words came to focus on positive aspects. And we should remember, that this went on from at least the mid 1990s where the cluster concept emerged in the environment, and to the downturn of the cluster in the late 2000s. This means that through almost 10-13 years, a positive discourse was created. Not least to attract students and engineers to the region which was a very explicit goal of the NorCOM association in its promotional work. What happened was therefore, that during these 10-13 years students and engineers were attracted to the region, because they were told that this was a success story, with companies among the best in the world. Companies who had a special heritage to Dancall, Cetelco and DC Development, organizations which helped launch a revolution to use the words used in relation to the impact of DC Development. They were told in discourses, that the NorCOM companies had world-class technology, and that this was what they survived on, as well as a special unity created through the joint heritage and the network in the cluster. Not much was mentioned about the weaker sides of the cluster, such as the lack of marketing capabilities and business capabilities.

What happened in other words, was that the success stories, which to an extent were told due to what may be called the success of some of the companies in relation to their work, but also came out of the promotion work where people in the NorCOM association explicitly tried to articulate the NorCOM cluster as a success story. This meant that discourses emerged which termed the cluster a success and the people in the cluster as being special, which in turn meant that weaknesses was overlooked.

What was the basis on which these discourses emerged? Part of this basis was the researchers who provided the concepts to build a self-understanding on, and another part is the development around Dancall which made it possible to detach the discourses about technological capabilities from discourses about lacking business and marketing capabilities.

9.1.6 Researchers provide the concepts and guidelines necessary for a self-understanding

We saw in the analysis of the scientific papers dealing with the wireless industry in Northern Jutland that already in the 1980s the discursive link to Silicon Valley was formed. Comparisons of the region and Silicon Valley were made, the story of the Fairchildren were compared to the SP Children in Northern Jutland etc. The thing to note from these scientific publications is that through these publications and the research surrounding them, people in the wireless industry in Northern Jutland were presented with concepts, which they could build their identity upon, and which also became guidelines for them.

In the beginning they were presented as an Industrial Milieu, then as a Technology District and finally as a Cluster. The publication where Dalum mentions that the concepts he presented was found interesting by the people in the environment, shows an important dynamics, which is that Bent Dalum, through his role as researcher, and his close involvement with the industry, became the person who brought the cluster concept into the minds of the people in the industry. He

knew the scientific theories about clusters and regional development etc, which the people in the industry did not know, and therefore the people in the industry absorbed the concepts and ideas he presented when they saw an advantage in doing so. This for example shows in the fact that it was Bent Dalum who argued for a cluster association to be formed, who came up with the idea for the name, and later it was also Bent Dalum who for a while, as shown by minutes from NorCOM meetings, gave presentations in the association about which companies that should be invited to join the cluster. It should be noted, that this influence did not only occur through the scientific articles, it also occurred through for example newspaper articles in which Bent Dalum and other researchers, explained the cluster concept etc. It should also be noted that Bent Dalum often talked with the people from the industry, he knew most of the people in the industry personally and often talked to them at different social events, and he took personal pride in knowing what the different companies were working with, what the networks in the industry were etc.

What happened was thus that from a scientific discipline certain concepts found their way into the wireless industry in Northern Jutland, and as such planted ideas and concepts which people in the industry could found a self-understanding on and use as guidelines for what to become. In this process, however, the story also shows that the concepts were reinterpreted by the people in the industry, and given a specific meaning.

Bent Dalum, with his background in the IKEA group had, as the analysis of the articles shows a focus on innovation and technology. In the first article dealing with the industrial milieu in the region we saw how the lack of business talent was articulated as a weakness. With Bent Dalum's focus on technology and innovation in the cluster in the region this explicit articulation disappeared. There is no doubt that Bent Dalum saw business talent as necessary, and that innovation and technological development in his perspective included more than a focus on technique. However, when the people in the wireless industry, most of whom had an engineering background, were presented with the ideas, the discussion about the importance of technology became understood as a question of technique. And as such the scientific writings on the NorCOM cluster emerging in the business department at AAU not only gave the people in the environment a number of concepts and guidelines to build their identity upon, it also strengthened the focus on technique.

So we have the success discourses created through the 1980s and 1990s, much of which builds on concepts delivered by researchers, notably Bent Dalum, and as discussed earlier, these success discourses became in turn rather fixed because of the struggles to find funding for 3G competences and the resulting relationships to IT Forum etc. The outcome of these discourses was that the people in the cluster had a specific understanding of how to behave in relation to their work. Let us therefore take the time to go back and look at the stories again to see where the specific understanding shows.

9.1.7 People ridged to their boundaries and their core, GSM

One place in the TIDK story, where it is very clear on a detailed level that people in TIDK saw themselves as different from employees in TI in USA, is in relation to the contracts the employees had to sign regarding export control etc. One employee in TIDK thus argued, as mentioned earlier, that he was sure that those rules did not apply to people in TIDK:

"Well, for example when they say that this and that person got into jail for so and so long time, because they did this and that, and yes, so what, you would definitely not do that in Denmark, that is for sure. That we are convinced of." (Engineer)

People in TIDK were described as being "rigid to their boundaries". They had their fields, and in relation to these they saw themselves as the best. As the TIDK story explored in detail, people in TI Dallas was seen as different, the rules that applied to them, did not apply to people in TIDK, in the minds of people in TIDK. Similar, TI Nice were seen from TIDK as having another approach to their work, as having a French work culture. Not only did people in TIDK agree that the other sites in TI thus had what they called a different work culture, they also saw themselves as clearly being different and separated from these. TIDK was described as being a geographically remote site from both the European headquarters in Nice and the main headquarter in Dallas. And geographically it was, as any map will show. Importantly, it was also a site far away in relation to the discourses and practices of people. What were much closer were the other organizations in the NorCOM cluster. They constituted a local network that the people in the cluster could turn to, when the situation within the MNCs became too strange. Or put differently, when the situation with political games etc. reached a point where the workers in the NorCOM cluster started to feel disillusioned because their work got too far away from what they themselves saw as their work, due to the discourses in the cluster, then they could find consolation in the other local organizations. This is for example shown by the fact that a manager from TI told how the network in the cluster could be used for what he called "moral support" when people in different subsidiaries faced similar challenges for example in relation to legal work within the MNCs. This observation shows how the managers in NorCOM used each other to maintain a distance to the situation within the MNC organizations of which they were part. By having such discussions they maintained that they were an 'us' compared to the 'them' within their respective MNC organizations, a 'them' who were doing things in a cumbersome way, had strange and complex practices, spent too much time on politics etc. when they, in the eyes of the NorCOM people, should be focusing more on technology and quality. And this reinforced and helped them maintain their own approach to the work.

So we have the companies finding it difficult to position themselves as subsidiaries. And whose interest is mainly in the technology. The focus on technology is also found in the struggle following the downfall of Dancall. Dancall's history is littered with statements about weaknesses in Dancall, and as such also in the NorCOM cluster. However, due to the discourses and practices around Dancall these weaknesses were not articulated as weaknesses, which applied to the R&D companies in the NorCOM cluster. Let us therefore have a look at the Dancall story.

9.1.8 Dancall's downfall results in public support for other industries

Dancall played a key role in the development of the NorCOM cluster, given that it was the largest company in the history of the cluster, and half of what formed the basis for DC Development, etc. It was at Cetelco, Dancall and DC Development, that the network of engineers was formed, which would live on throughout the rest of the history of the cluster. It was also, importantly, where specific practices related to how people worked in the NorCOM cluster were developed. We saw in the analysis that it was DC Development which became the basis for the unity in the cluster, and the organization which gave the basis for people in the cluster arguing that if they stood together, and helped each other, then they could compete with the giants in the industry. A point in the TIDK story is also important in this regard, because one manager with a background at Cetelco noted, that he had always said that Cetelco should have had support from the ministry of education, because newly educated engineers would leave university and then get jobs in Cetelco and there they would learn in practice what it was like to work in the industry. And when they had learned that they would move on to other companies. This indicates that within the relatively small world existing between AAU, Cetelco, Dancall and DC Development, a rather specific practice to the work was developed.

Dancall's early history has often been articulated as the core in the story of how technologically strong the region was, i.e. that this region could have competed against Nokia, and become the next Nokia. And an interesting picture emerges from the analysis of the discourses surrounding Dancall, because it shows how a distinction was made between the R&D companies in the cluster who bought into the argument that the technology in the region was so good that Dancall could have become Nokia, and then Dancall itself after the DC Development phase.

As the market and the technology moved on, we saw how Dancall became too small to stand alone, and was acquired by Amstrad as the first in a series of MNCs. The story of Dancall showed two things: Firstly how organizational capabilities and marketing capabilities were lacking. Secondly, how the issue of these lacking business and marketing capabilities was transformed into a question of production work in a high-wage peripheral area in Denmark.

The newspaper articles emerging around the different acquisitions of Dancall showed clearly, that the company was lacking the organization capabilities as well as the marketing capabilities and the sheer size to compete in the mobile market. However, each time an acquisition occurred it was argued, that the acquiring company possessed the necessary complementary assets, for example size and resources as well as organizational capabilities.

Therefore it seems that each acquisition was seen as a new beginning to a successful phase. As such the acquisitions thus strengthened the discourse that MNCs brought complementary assets into the region, and therefore the dynamics around Dancall created no pressure to develop business or marketing competences within the region, or even rethink the notion of business as choosing the next killer application. Finally, with the sale of R&D to Siemens and the move of this to Nørresundby and the following struggle of Flextronics to survive, the distinction between the discourses dealing with the successful R&D companies in the NorCOM cluster and the Dancall organization that lacked business and marketing capabilities became complete as discussed in the analysis. The rest of Dancall, in the form of Flextronics, became part of another 'us'. This is illustrated by the fact that the mayor of Pandrup started referring to Dancall as an 'us'. This shows how Dancall went from being part of an 'us' in the NorCOM cluster which was formed in the late 1980s and early 1990s to being part of another 'us' which existed in relation to employment in peripheral Denmark. Strikingly, this story thus shows how Dancall went from being a part of the core of the NorCOM cluster to being articulated as a company which was different from the companies in the NorCOM cluster, and which faced other problems. This in turn meant that although it was articulated numerous times in the discourses around Dancall that this company lacked business and marketing capabilities, this lack was transformed discursively into something, which applied to a particular company, not to the NorCOM cluster. The discourses about how good the companies in the NorCOM cluster were could thus survive without having to deal with the weaknesses of lacking business and marketing knowledge.

9.1.9 Political games difficult for managers that focuses on technology

So what are we left with, when looking at the challenges faced by the people in TIDK as well as in the NorCOM cluster, in the stories above? How were they constructed as subjects? The analysis of TIDK showed that they were different in the approach to their work that people in other TI sites in Nice and Dallas. Having now combined the insights from the two stories; a clearer picture emerges of how they had become that, and why they had the characteristic which were identified in the TIDK story.

The analysis of TIDK showed that people in TIDK faced a reality within TI where they were part of political games. The political games were about tasks and competences, and about creating truth in the organization. The games were about convincing others about one's value for TI.

About gaining a *raison d'être*. We also saw, that people in TIDK felt that these games and the networking activities etc. which they demanded, was a distraction from their 'real work'. Real work was in the minds of people in TIDK to develop technology of a high technological standard, this they saw as the core of their work, not political games and positioning issues. This focus meant that seen by people outside TIDK in other TI sites, people in TIDK lacked leadership. They were not capable of making an impression on management in TI, and be visible to this management. They were putting all their cards on the table, they were naïve, they were helping each other, they were consensus oriented, and they were not paying enough attention to political games, etc. as the analysis of TIDK illuminated.

We can now, with the insights from the analysis above answer the two questions I started this chapter with. First, how come the people in TIDK did not change? To this the answer is, that this was because they found themselves surrounded by a number of discourses and practices which meant that they saw a focus on technology, quality and helping each other, as the correct or right approach to their work. And the analysis has traced the emergence and decent of these discourses. We saw how the discourses around DC Development gave rise to a unity, and a practice of helping each other in the region. The only way in which the small players Dancall and Cetelco could compete against the large players in the industry was to help each other and be open and honest. We saw how, during the 1990s a discourse about the wireless industry in Northern Jutland being a cluster emerged in the region, and what role business researchers from AAU played in this regard. We saw how the cluster organization was promoted in the mid 1990s, and how the cluster turned into a success story of fairytale proportions in the late 1990s. We also saw how, due to the developments around Dancall, the issue of lacking business and marketing capabilities in the cluster was transformed into an issue of production work in a high-wage area. And we further saw how, given the success stories focusing on the GSM competence, and the struggle to attract funding to make the jump to 3G, the organizations in the NorCOM association were isolated in a struggle against other organizations in the region, for example some parts of AAU as well as the municipality, county and IT Forum. This in turn meant that the focus on technology remained, and became understood in a very specific way as choosing the next killer application, i.e. as a matter of something technological. We also saw how this meant that new business areas were not pursued, which in turn, according to some meant, that from the late 1990s already, the cluster was on a course destined for failure. The discourses and practices were the basis on which people in the NorCOM cluster created their self-understanding, and therefore, they also maintained their focus on technology and quality above organizational politics, which were seen as a distraction from their work throughout the history. The analysis also shows that this approach to the work was not something which was specific to TIDK; it was something which characterized the cluster as a whole.

The outcome was that the people in TIDK had a specific approach to their work, which was constructed through discourses and practices within both TIDK as well as the wider NorCOM cluster. This also showed in the fact that they played the political game within TI in another way than people in TI Nice and TI Dallas. And due to the success stories, which were created through the late 1990s, the employees in the NorCOM cluster believed that they were the best in the world, and therefore they struggled to maintain their own approach to the work. This is how the people in TIDK did not change much over time in relation to their approach to their work, and it is also why the people in the NorCOM association found it difficult to change, and why Niels Buus for example came up against an understanding of business which was difficult to change. People in the NorCOM cluster were constructed as the subjects they were through a number of discourses and practices within the cluster, as the analysis above has showed. And who these persons were as subjects are reflected in the way they behaved in relation to their work, and in relation to the challenges they faced as workers.

Above I have discussed the discourses and practices through which people in TIDK, were constructed as subjects in relation to their work. What I have presented is as such the problematizations which make it possible to discuss people in TIDK as subjects who had a specific understanding of how to approach their work. To round off the discussion of these problematizations I will like to pick out certain aspects of them, certain issues, which had a fundamental place in the problematizations. In other words, certain problems which are central to understanding how people in TIDK were constructed as subjects and how come they behaved as they did in relation to their work.

9.2 Important aspects of the problematizations

In their work, people in TIDK, as well as the people in the NorCOM cluster more broadly, were faced with a number of problems, to which it seemed that there would be one solution or another. It seemed that they had to make a decision and do one thing or another. As it turned out, the analysis shows that they had to do both, even though this sometimes seemed impossible. It was, in other words, not a matter of choosing “one or the other” but instead doing both. What made the people in the cluster the specific subjects they were in relation to their work was their way of choosing sides in these situations.

9.2.1 Technology or business

One problem the analysis reveals is the tension between a focus on technology and a focus on business among the people in the NorCOM cluster. It appears from the analysis, that a focus on technology emerged among people in the NorCOM cluster, and this focus meant that business was understood in a very specific technical way, as choosing the next killer application, and building the technological base for working with this. This made it difficult for people who had another understanding of business as finding and growing markets and making profits on these. One can frame the situation in the way that people in the NorCOM cluster also sought to make a profit, and in their understanding of their situation, the way to do so, was to build specific technological competences. And their argument was that without technological competences it was impossible to be a player in the wireless industry. Technology thus preceded business, without technology there could no business. The critical question to this may be: yes, technological competences were needed, but what kind of competences, why not some useful for the exploitation of niche markets? And why not competences, which were not necessarily “the best”, but only “good enough” and thus, demanded fewer resources? The point is, and why I frame this as a central problem is, that the choice was seen as an “either or” by the people involved. Either we do technology or we do business. And since technology is the necessary basis, we have to choose this. This line of reasoning seems rather logical but the conclusion to draw from the detailed analysis above is, that maybe it was not a matter of either or, but a matter of doing both technology and business, and then be aware of the inherent dangers in both choices.

Foucault argued, as I discussed in the second part of this thesis, that everything is dangerous. There are no choices that do not carry with it certain dangerous issues. And this also applies to the perceived choice between technology and business, which the people in the NorCOM cluster faced. Choosing technology only meant, as the analysis showed in detail, that business was interpreted in a very specific way, which in turn meant that a number of possible niche markets and opportunities for cooperation between different environments in Northern Jutland were not pursued. The choice of business would also have brought certain challenges. We saw that when GSM was chosen as the focus area, and the mobile phone industry as the field in which people operated, then the jump to 3G was also necessary, and therefore it also made sense to focus the resources on this jump. The conclusion here is therefore not, that people should have chosen business as their focus instead. The very point of framing the analysis as it is done in this thesis;

is to analyse how the people were constructed as subjects in relation to their work, so that they saw something as right and something else as wrong, and thus also had an understanding of what they should do to be a good employee. My point is therefore not to argue that they should have behaved differently, or realized that they should have focused on business also, because this was impossible for them, they did exactly what seemed right to do at the given points in time and space, due to the discourses and practices which shaped them as subjects. What the Foucaudian analysis can do is to question this history that made them what they were, and by having conducted such an analysis above, we see that one tension which emerges from the story, is the focus on technology vs. the focus on business.

What can we then use this analysis for, when returning to the issue of drawing conclusions from phronetic research, and generalizing these? The conclusion to draw from this is that when we are faced with a cluster, consisting mostly of R&D companies, then it is important to also question the business side of the cluster. How do the people in the cluster understand business? Are they only focusing on technology, are they only focusing on business or are they focusing on both? And what is their understanding of technology and business, and what is the impact of these understandings?

Two things should be noted to this conclusion: Firstly, I will stress that the conclusion is not to say that people in high-tech clusters consisting of R&D companies should by default focus more on business and less on technology. The conclusion is that it is necessary to investigate how the understanding of technology and business is created in the cluster, and thus how technology and business are understood amongst the people in the cluster. When that is done it is possible to conclude whether there are dangerous situations in the cluster, as the one we saw in the NorCOM cluster where the focus on technology became so pervasive that business became understood in a very specific way. This meant that certain possibilities apparently were not explored, and that political games became played in a specific way which made it difficult for the MNC subsidiaries to obtain a *raison d'être* within the MNC organizations.

Secondly, the researcher coming from the conventional cluster literature might argue to this conclusion: "Well, this is just the process of lock-in in clusters that you have identified". To this I will argue both yes and no. Yes, because I have shown how people in a cluster can become constructed in a way, which means that they stick to some specific ways of doing things. No, because I have not only showed this, I have also presented a way of analysing this, and I have by conducting a genealogically and archaeologically inspired analysis added far more nuances to the argument, that we find in the literature on lock-in. I will elaborate on this in section 9.3.2 below, where I will meet the cluster literature.

9.2.2 Competences versus organizational form

What emerged in the NorCOM cluster was as discussed above a focus on technology. Technological competences were seen as the key to the cluster. As long as the technological competences were in the cluster, the cluster would prevail, because either people in the cluster would start companies themselves using the competences or MNCs would acquire the competences and create subsidiaries. What emerged was thus a tension between competences and organizational form, if we may call it this.

In the minds of the people in the cluster, the competences were the important thing in the cluster, and the organizations were something less important. Or to put it more blunt, the conception was that as long as competences would prevail, organization would come and go, and the cluster with a number of workplaces would prevail. What we find is thus a distinction between the competences forming the core of the cluster and the organizational forms they give rise to,

i.e. either small or large local companies or MNC subsidiaries. But could there be sustained competences without sustained organizations, and the capabilities to navigate and steer organizations of different kinds?

The tension is that apparently there were organizations, but people did not have the competences to bring the small local organizations to a state where they had the basis for developing new competences. Likewise, they lacked competences to bring the subsidiaries in new directions which gave room for development of new competences. This means that there was not a sphere organizationally, which could encompass the development of new competences, which could take the place after GSM. So it was the competences, which sustained the cluster since they gave rise to start-ups and subsidiaries, but new competences were not developed. As such the NorCOM cluster in one perspective became one pulse, in form of the joint venture between Dancall and Cetelco, which through the development of the GSM capabilities gave life to the cluster for the following 15 years.

There are different views on the situation as the analysis showed, but looking at the overall picture, it is worth recalling Niels Buus' critique, that it was not people in the cluster who created work places, it was the MNCs outside the region who had the capabilities, organizationally, business wise and marketing wise to turn the capability into jobs. Being critically and maybe too harsh, one could pose the provoking argument, that maybe instead of saying that it was terrible that the MNCs pulled out, another approach would be to say thank you to the MNCs for around 15 years within the industry. What could have sustained the cluster seems to be either capabilities related to being local organizations with the focus on business and marketing capabilities that demanded, or an approach to being subsidiaries with another approach to politics and positioning issues, which could have ensured the development of new competences. And as such we are back to the tension between the focus on business or technology.

The competences forming the basis for the cluster came to be seen as something technological. We saw in the analysis above, how through the late 90s the competences available in the cluster were actually questioned. There was a phase, where it was argued in the discourses dealing with the cluster that the entry of MNCs supported the cluster because they possessed the business and marketing competences that were lacking in the cluster. However, we also saw how the lack of such competences was transformed into another discourse around Flextronics and low skilled work places in the periphery of Denmark. And the discussion about the complementarities in MNCs soon disappeared also.

The phronetic conclusion to draw from this is the following: When we are faced with a cluster, consisting mostly of R&D companies, then it is important to question whether there within the cluster is a focus upon and the competences needed to create viable organizational forms and sustain technology development?

I am not arguing that the cluster should have the same organizational forms forever. The spin-off process may have some advantages, because it gives rise to new organizations, and small local organizations have a freedom which the MNC subsidiaries do not have, while the MNC subsidiaries have a size which makes something possible which local companies cannot do. The point is, as we saw in the analysis, that because the NorCOM cluster was constructed as it was, and people in the cluster were constructed as they were, it was difficult for them to function as a local organization, due to the specific understanding of business developed in the cluster, and they also found it difficult to function as an MNC subsidiary organization, due to their focus on technology and relatively less focus on organizational politics and positioning within MNCs. What can be concluded from the analysis above is that due to the specific understanding of tech-

nology as the basis for the cluster, the people in the cluster had difficulties functioning both as local companies and as MNC subsidiaries.

9.2.3 An 'us' versus a 'them'

Another tension which emerged in the story above is the distinction between an 'us' and a 'them'. The analysis showed that 'us' is a complex entity, and actually three 'us' existed. The 'us' in the early phase was an 'us' formed in relation to a 'them' outside the cluster, being MNCs with whom the people in the cluster were engaged in a struggle to develop the GSM phones. Later, as the analysis revealed, the 'us' in the cluster became an 'us' which included in some respects the external MNCs, and this 'us' thus crossed the cluster boundaries, at it became an 'us' engaged in a struggle with local organizations within and around the cluster, for example the university, the county and municipality and the IT Forum association.

The 'us' which was important for the self-understanding of the cluster was thus a complex entity which transcended the cluster boundaries. This suggests that when analysing a cluster, it is dangerous to assume that there is a distinction between the people and the dynamics within a cluster and the people and dynamics outside the cluster. External MNCs can be a part of the 'us' in the cluster, as the analysis showed, which can be engaged in struggles with other local actors, for example parts of the local university.

When analyzing clusters, the conclusion to this aspect of the analysis must therefore be that in cluster research it is impossible to make the assumption that there is a distinction between the actors and organizations within a cluster and the actors and organizations outside a cluster, when investigating how a self-understanding is created in a cluster.

By showing this in one case, this thesis has an important implication for a large part of the cluster literature dealing with cluster boundaries. In much of the literature it is stated that special identities, culture etc., can develop within clusters. This analysis showed, that the development not only happens within a cluster, organizations outside a cluster can be an integrated part of the 'us' emerging within a cluster, and thus have a significant impact on the way in which people in clusters are constructed as subjects and thus how they behave, and thus also on their ability to change to new technologies, new markets etc.

The part of the cluster literature where this finding shows its disrupting value the most, is in relation to the buzz and pipelines literature, where it is very explicitly assumed that the dynamics within clusters are different compared to dynamics crossing cluster boundaries. This thesis shows that the distinction between buzz and pipelines is too simple, and not capable of describing the complex interplay between the internal and external dynamics this thesis illuminate. Therefore, in section 9.3.1 I will also discuss in detail the findings of this thesis in relation to the buzz and pipelines theory. Having now discussed some of the central issues in the analysis above, it is time to turn to the conventional cluster literature and meet this.

9.3 Meeting the conventional cluster literature

This thesis represents a new approach to cluster research and also an approach which can give new valuable insights to researchers working with clusters. Therefore I think it is important to turn back to the conventional cluster literature now and discuss the approach of this thesis and its results in relation to the approaches and theories in the conventional literature.

The conventional cluster literature can, as mentioned earlier, roughly be divided into three streams of literature, the new economic geography approach, the economic approach and the

historical approach. To make it clear what the contributions of the analysis in this thesis are, let me start this section discussing my approach and the results of the analysis above in relation to the conventional literature on a general level. Thereafter I will pick four theories from the conventional cluster literature and discuss them in detail in relation to the results from my thesis, to thereby bring the discussion from the general to a specific level, and thereby show in detail how my results can be used to elaborate our understanding of the strengths and weaknesses of the conventional cluster literature. The four theories are the theory about buzz and pipelines, the theory about lock-in, the theory about related variety and finally the theory about communities of practice in clusters. This discussion will thus also complete the circle by going back to the concept of COPs, which I started this thesis with.

What unifies the conventional cluster literature is the use of universal theories. I underscored earlier that the results of the research conducted in this thesis is not universal theories, and therefore my objective here is not to compare my results directly with the universal theories found in the conventional cluster literature. Instead it is to discuss the knowledge which my approach to cluster studies create in relation to the knowledge we gain from the existing theories on clusters.

The argument I will make in this section is that to understand the contribution of my approach to cluster studies, and the results from the analysis above, it is necessary to question the universal theories in the conventional cluster literature along two dimensions using the problematizations which the analysis above identified as the basis. The first dimension is whether the conventional theories describe the dynamics they set out to describe in a satisfactory way. The second dimension is that when these theories are used to frame an issue, do they then frame it in a way, which means that certain other issues are overlooked?

Let me first address these two dimensions at a general level, and thereafter at the specific level where I pinpoint the weaknesses in certain conventional cluster theories. On a general level, the best way to frame the issue is to say, that it is a matter of how one as a researcher understands the term “cluster”; as a universal theoretical concept, or as a contextual historical object.

This difference between understanding the cluster as an theoretical concept, as the conventional cluster literature does, or as a specific context-dependent historical object developed at a certain point in time and space, is key to understanding what the contribution of this thesis is when situated alongside the conventional cluster literature. In the conventional cluster literature the cluster is a theoretical concept, which is filled with content at the beginning of the analysis. In the phronetic and Foucauldian approach the cluster concept is an empty concept at the beginning of the analysis.

We have in the conventional cluster literature on the one hand the universal context-independent theories describing the world, and on the other the reality, which researchers investigate through empiric data, in an objective manner, some would argue, so that they can build and test new theories describing this world. This means that the cluster is a concept in a theory, and this theory describes what counts as a cluster, through definitions, and what dynamics that operate in clusters, and thus explains the emergence, existence and disappearance of clusters through these dynamics. The point is that the cluster is a concept which is full of content at the beginning of the analysis. And this content can only be descriptions, models, theories, which are universal applicable in the case of clusters given the definition of these. This means that when looking at the real world where a large number of clusters exist, which are all unique in some ways, only the lowest common denominator, which is equal across this selection of unique clusters, or at least a subsection of these, i.e. a specific type, can qualify to become described in a universal theory. Given the approach in the new economic approach as well as the economic

approach, where the construction of theoretical concepts is in focus, and empiric data plays a secondary role, as it is only used as a basis for testing and validating the theories, the result is that empirical data is only used to test what the researcher is looking for in these two approaches. In other words the researcher has a concept, which has a specific meaning, a specific content, and he tests whether this content is correct or not, using empirical data. And even in some cases, this step is left out. As argued earlier, some of the contributions about knowledge based theories of clusters in the economic approach can be criticized for being pure theoretical construction exercises in which empirical data is not included at all. In the historical approach, at least, the empiric data plays a larger role.

Opposing these approaches is the phronetic approach, utilizing Foucault's ideas, which I have sought to advance in this thesis, which turns the situation upside down. Here the cluster starts as a empty concept, and the researcher analyses what makes it possible to, at a certain location in space and time, discuss the existence of a cluster, for example the course of events, discourses and practices which made it possible to discuss the existence of the NorCOM cluster. In exploring this, the researcher looks not for the dynamics which may or may not be found in similar shapes and forms in other clusters, to make universal theories about such, but instead for the actual context specific history which made the cluster in focus. This means that the phronetic researcher, as I have done, tries to investigate empirically the construction process. It should also be noted, that by doing so also contributes to the discourses and practices surrounding the cluster, and is as such also influencing the cluster. This impact of the researcher on the thing he studies cannot be avoided, as discussed earlier, and is also what makes the phronetic approach important, and something which can make the social science matter again. This means that in this approach the cluster concept is empty at the beginning of the analysis. And the researcher asks how it emerged, and through the following analysis he fills the concept with content by writing the history of the discourses and practices which made the cluster what it was.

The NorCOM cluster in my perspective thus becomes not one example of a collection of companies and institutions etc., which may fulfil the demand from one or more universal theoretical definitions of what clusters are. It is not a thing, which should be tested against certain definitions of what clusters are or what they are not. It becomes instead a local and specific cluster, it becomes "the" NorCOM cluster, which is articulated among a number of people in specific contexts, in specific scientific papers and specific news paper articles just to mention some of the places where the name emerged. To make this clear, the NorCOM cluster is, in my perspective, not a collection of companies and institutions, which can be termed a cluster using different universal theories on clusters and their definitions, it is an articulation emerging in a number of discourses at different places in time and space, most of which were centred in different contexts in Northern Jutland between the late 1980s and the late 2000s. The NorCOM cluster in my perspective thus becomes the thing, the object, which is articulated in specific discourses in space and time.

The objective of my research thus become to investigate how the cluster emerged and how the subjects within it was constructed as subjects in relation to their work, not through a departure in conventional cluster theory, which is operationalised into a theoretical framework in advance of the analysis, specifying what to investigate empirically in the analysis; but instead through a departure in the real history unfolding in and around the NorCOM cluster, to use Foucault's history term from his discussion of genealogy. To elaborate on this, the departure in conventional cluster theory would mean for example, if one is looking at the issues of a special culture, to take point of departure in universal theories about clusters and culture to firstly verify that the NorCOM cluster is indeed a cluster, and then secondly use the theories to identify the companies and institutions etc. which are part of the cluster, and finally investigate which of these that are characterized by a special culture, and conclude whether or not this majority of this cluster, as

described by the theoretical definition, is characterized by this culture. The cluster in such an approach emerges in the hand of the researcher who investigates the field. It is through his conclusion that something qualifies as a cluster that it emerges. And thereafter he fills this cluster with a history by going through the empiric data investigating for example whether a sufficient part of the companies within the cluster contains a specific culture, and thus whether or not the cluster can be concluded to be characterized by such culture. The researcher subscribing to the phronetic approach to social science, and Foucault's methods, will accept, that the cluster emerges as a concept, an entity, a object, an articulation which enters into the game of true and false, and exists at a specific point in time and space, as the outcome of certain specific events, as the outcome of specific discourses and practices.

So we have on the one hand an approach in which the cluster is a concept, which is filled with content by the researcher, but only content in the form of descriptions of the dynamics within cluster which are universal to clusters, i.e. the content of clusters in this approach can only be content which is context independent. Opposing this is on the other hand an approach which treats clusters as a empty concept which is filled with content through the analysis, content which is contextual, and the goal of the researcher is to uncover this content, i.e. how the specific cluster, with its specific actors and specific discourses and practices emerged.

Given these two approaches, it emerges, that the reason why, it to some extent makes sense to compare the insights from the two sides, is that whereas one tries to create the content of the concept of clusters through universal theories, the other tries to investigate what the content of actual clusters are. The issue is, in other words, are there any similarities between what the theories in the conventional literature describes are the content of clusters and what I find in my phronetic study? I am not arguing here, that we should compare the two directly. I am not arguing, that we should transform the results of phronetic research into universal theories, or use it to falsify the universal theories. I am not arguing either, that we should use the conventional literature to validate the results from the phronetic research. I am simply arguing for a comparison of the results from the two approaches, to thereby give us a better understanding of the strengths and weaknesses of the two approaches.

And this brings me back to the two dimensions I mentioned earlier, which are whether the conventional theories describe the dynamics in clusters in a satisfactory way, and whether the use of the theories means that certain dynamics are overlooked. I argued above that in the conventional cluster literature, the cluster is a concept which is full of content at the beginning of the analysis, and this content guides what the conventional cluster researcher looks for in his empirical analysis. In the Foucauldian approach, the cluster is empty at the beginning of the analysis, which forces the researcher to follow the empiric data, and uncover all the dynamics that had an influence on the case. The Foucauldian analysis thus becomes broader in scope, and by using this approach it is possible to uncover issues which the researcher had not thought about at the beginning of the analysis. To illustrate this strength of the Foucauldian approach, and how the results of my analysis thus makes it possible to elaborate on the weaknesses of conventional theories, let me therefore now turn to four conventional theories within the cluster literature, and discuss these in the light of my analysis above.

I have chosen the four conventional theories below because they to a certain extent describe some of the dynamics we saw unfolding in relation to the problematizations described in the previous chapter. Due to the complex account of the problematizations in the analysis above, this will clarify how simple some of the conventional theories are in their description of the dynamics within clusters, and importantly, also some issues that are overlooked when the theories are used.

9.3.1 Buzz and pipelines

The previous years have shown a growing focus on the concept of buzz and pipelines in relation to the evolution of clusters. The ideas from the widely cited contribution by (Bathelt, Malmberg, & Maskell 2002), and the later version (Bathelt, Malmberg, & Maskell 2004), have gained a significant foothold in the literature on clusters. The basic ideas have also been elaborated on, primarily by the authors themselves in their discussion of so called “temporary clusters” occurring at trade fairs and conventions etc. (Maskell, Bathelt, & Malmberg 2005). Given that the buzz and pipeline theory focuses on the interplay between what goes on inside cluster and outside clusters, it is interesting to discuss this theory in relation to this thesis, since this thesis grows out of exactly the question of how the local world within clusters and the global world which they are part come together, see chapter 1.

(Bathelt, Malmberg, & Maskell 2004) interpret (Marshall 1920)’s famous “in the air” as something they call buzz. Their inspiration for using this term comes from different contributions each talking about the same basic idea, for example (Storper & Venables 2002)’s discussion about buzz. The idea is that, “a certain milieu can be vibrant in the sense that there are lots of piquant and useful things going on simultaneously and therefore lots of inspiration and information to receive for the perceptive local actors” (Bathelt, Malmberg, & Maskell 2004, p.38). They therefore describe buzz as:

“Buzz refers to the information and communication ecology created by face-to-face contacts, co-presence and co-location of people and firms within the same industry and place or region. The buzz consists of specific information and continuous updates of this information, intended and unanticipated learning processes in organized and accidental meetings, the application of the same interpretative schemes and mutual understanding of new knowledge and technologies, as well as shared cultural traditions and habits within a particular technology field, which stimulate the establishment of conventions and other institutional arrangements. (Bathelt, Malmberg, & Maskell 2004, p.38)

It consists of information that is spread. It also consists of learning processes. It also consists of the application of similar schemes for understanding new knowledge. Finally, it also consists of shared cultural traditions and habits. Buzz it seems from this description is a rather complex entity, consisting of information as well as shared cultural traditions. (Bathelt, Malmberg, & Maskell 2004) go on to argue, quote:

“Participating in the buzz does not require particular investments. This sort of information and communication is more or less automatically received by those who are located within the region and who participate in the cluster’s various social and economic spheres.” (Bathelt, Malmberg, & Maskell 2004, p.38)

Buzz thus consists of communication processes in which information is spread among actors within clusters. The importance of this diffused information arises, because it enhances learning processes due to similar schemes for understanding new knowledge and shared cultural traditions and habits within the cluster, which in turn “stimulate the establishment of conventions and other institutional arrangements” (Bathelt, Malmberg, & Maskell 2004, p.38). Or as (Bathelt, Malmberg, & Maskell 2004) also put it:

“Being located in the same place also enables firms to understand the local buzz in a meaningful and useful way. This is because co-location within a cluster stimulates the development of a particular institutional structure shared by those who participate. Firms develop similar language, technology attitudes and interpretative schemes” (Bathelt, Malmberg, & Maskell 2004, p.39)

The buzz therefore takes on different forms, and (Bathelt, Malmberg, & Maskell 2004, p.39) mentions the following, quote: “chatting, gossiping, brainstorming, in-depth discussions, problem analysis”. This is an elaborate description of buzz, and with it (Bathelt, Malmberg, & Maskell 2004) argue that local communication within a cluster, and the diffusion of information that follows from it, enhances learning in the cluster, as well as the construction of shared understandings and institutions in the cluster, which in turn gives value to the communication and information diffused.

Global pipelines are defined rather simple as channels of communication used in distant interactions (Bathelt, Malmberg, & Maskell 2002). Global pipelines are according to (Maskell, Bathelt, & Malmberg 2005) expensive to create and maintain because they form bridges between different cultural and institutional contexts. That is the one that exist within a given cluster and outside this cluster where the global pipelines are anchored. The strength of global pipelines is their ability to give actors access to less known bodies of knowledge because of this span between different contexts etc. Therefore pipelines also enhance the basis for innovation in companies (Maskell, Bathelt, & Malmberg 2005) (Malmberg & Maskell 2006).

The argument basically is that a local buzz of high quality creates a dynamic cluster, and a network of pipelines supports the cluster in two ways. Firstly, by giving the actors who have the pipelines access to bodies of less known knowledge. Secondly, because the knowledge these actors gain through their pipelines afterwards is spread to other actors in the cluster through buzz (Bathelt, Malmberg, & Maskell 2002).

The important point highlighted by the theory about local buzz and global pipelines is the interplay between local knowledge flow (the buzz) and global knowledge flows (the pipelines). The problem is that the theory is relatively simple in the way in which it conceptualizes buzz as a dynamic within a cluster, and that it builds extensively on different rather loosely defined concepts. As argued earlier the economic approach is scientifically even weaker than neo-classical economics because it builds on less well-defined concepts. Let me discuss the research in this thesis along two axes in relation to the buzz and pipeline theory; firstly, in relation to the methodology and secondly, in relation to the results.

The methodological issue with the buzz and pipelines theory is, that since it is constructed using different theoretical concepts as building blocks, refer to (Bathelt, Malmberg, & Maskell 2004), it offer no arguments about how to identify and analyze what the special “shared cultural tradition” is etc.. There are no methodological discussions about what to look for in the cluster, or how to analyse a specific cluster using this theory, the argument simply is that in clusters, in general, buzz and pipelines can exist and be valuable for the development of the cluster. In a way, this thus becomes a rather useless theoretical concept, because how can it then be used in a specific contextual cluster? What is the right mixture of buzz and pipelines for example? This is a issue raised towards the end of (Bathelt, Malmberg, & Maskell 2004), where the economic line of thought which underpins the contribution becomes most clear. In the section “Countervailing forces and limitations” the authors for example pose the question “Can a cluster become so overcrowded that there is too much buzz?” (Bathelt, Malmberg, & Maskell 2004 p.47), and they discuss this question in a perspective where buzz is equal to information exchange, using insights from decision making theory. But this question, given the previous discussion of buzz also implies that what they ask is whether there can be too much culture – but one might wonder whether it is possible at all to have a notion of too much culture, is there not one culture with specific characteristics? What the final sections of (Bathelt, Malmberg, & Maskell 2004) show when read critically is that this contribution is an exercise in combining socially constructed concepts related to clusters and knowledge in logical ways without much focus on whether the concepts, when regarded in meticulous detail, actually fit together and make sense together, and

also without a focus on how to apply the resulting theoretical model in real contextual specific clusters. It is thus also interesting to note, that although this paper comes out of a hypothetical approach to science there are no discussion, whatsoever, about empirical data, to verify or falsify the developed hypotheses. Where the strength of the phronetic analysis of the NorCOM cluster based on the methods developed by Foucault show, is thus in the detailed analysis it makes possible. It present an methodological approach which makes it possible, as the previous chapter showed, to analyse how a specific culture emerged, i.e. how specific discourses and practices shaped the cluster over time, and also what characterized this special culture as well as how the local actors and the external MNCs came together in the process. It thus present both a methodological approach which can be used in empirical work as well as a much more detailed result regarding the interplay between the dynamics within the cluster and the relations to organizations outside the cluster, which is context specific, and can be used by people in the NorCOM cluster.

Let us now turn to the results of this thesis and look at these in relation to the buzz and pipelines literature. Given that the underlying idea in the economic approach is the quest for universal theories explaining the dynamics within clusters, it comes as no surprise that it is actually possible to find dynamics in the NorCOM cluster which are similar to the ones described by the buzz and pipelines theory. The analysis in the previous chapters showed, how a specific culture regarding technology and quality emerged as well as a special attitude towards business emerged. This can indeed be understood as there being a “mutual understanding of new knowledge and technologies, as well as shared cultural traditions and habits within a particular technology field, which stimulate the establishment of conventions and other institutional arrangements.” (Bathelt, Malmberg, & Maskell 2004, p.38) in the NorCOM cluster. Turning to the pipelines, the picture becomes a bit more blurry, because, as the analysis above showed there were indeed many relations crossing the cluster boundaries, but were they simply relations which were expensive to maintain and which in turn gave new insights on things?

We saw in the analysis of TIDK, that ATL Research had many pipelines, but some of these were to people in companies outside the NorCOM cluster which the people in ATL had worked with earlier, and who in some cases were the ones who contacted ATL Research. We also saw, interestingly, that although TIDK had a number of pipelines, they did not all have the effect of opening up the horizons of the people in TIDK and making them do things differently. We saw for example, how people in ATL Research settled for pipelines to customers within the GSM field, because these people knew the wireless technology which people in niche markets unfamiliar with the wireless industry did not. Pipelines in this regard were to people who had a similar understanding of the world as the people in ATL Research. This questions the assumption in the buzz and pipelines approach that pipelines to organizations outside a given cluster are necessarily expensive and results in new ways of doing things. And this leads to what is possibly the largest weakness with the buzz and pipeline theory, and this is the assumption of a clear distinction between relations reaching outside the cluster as few and expensive and relations inside the cluster as pervasive and cheap given the shared culture.

Two things in the analysis above highlight this weakness. Firstly, most of the organizations within the NorCOM cluster were MNC subsidiaries, which had close relationships to headquarters and other sites within the MNCs. And therefore these organizations were not local organizations, which had only a few expensive pipelines to other organizations outside the cluster. They were organizations which as subsidiaries were linked in complex organizational configurations with other MNCs sites around the world, and as the story of TIDK showed, the work within the subsidiary organizations were linked to work at other sites outside the cluster with which the people in the subsidiaries interacted on a daily basis. The buzz and pipelines theory seems to implicitly have the assumptions that the organizations in focus in clusters are local organiza-

tions, which have most of their interaction in relation to other local organizations, since pipelines are seen as few and expensive. Therefore the theory cannot be used to conceptualize the situation in MNC subsidiaries, such as TIDK, in which people interacted with people in other TI sites worldwide as well as with customers on a daily basis. And this leads to the second point. The second issue in the pipeline argument is that pipelines per default are expensive due to them bridging in different cultures. The analysis above showed, that there indeed were an 'us' in TIDK versus a 'them' in other TI sites, but the detailed analysis of the different 'us's in the NorCOM story also showed, that the external MNCs were part of an 'us' in the cluster which existed united in the struggle against other local organizations, for example parts of AAU. This, the buzz and pipeline theory cannot capture.

The issue with the buzz and pipelines theory is that the "how" question is already answered in the theory: how does cluster development occur – it occurs from the right combination of buzz and pipelines, which gives rise to knowledge development, as argued in (Bathelt, Malmberg, & Maskell 2004). The theory is full of content at the beginning of the analysis, and this content also provides an answer to the 'how' question, to use the terms I used in the previous section. And this means, that the empiric data has to be forced into the relatively simple frame, how much buzz is present, how many pipelines are present, is it the right combination? And this means that there can be some dynamics, as the ones revealed in my analysis, which there is no place for in the buzz and pipelines theory, and which are thus overlooked if the theory is used.

As my analysis above thus shows, the buzz and pipelines theory constitutes a relatively simple explanation of the dynamics within clusters, and the situation within the MNC subsidiaries in the NorCOM cluster is difficult to fit into this explanation. The subsidiaries are located on the border between buzz and pipelines, and as such it is difficult to conceptualize their situation using the distinction between buzz and pipelines. What are the relations to headquarters for example? This leads to the other problem discussed above which is, that the distinction between buzz inside and pipelines to the outside is too polar, because it conceptualizes an 'us' within a cluster and a 'them' outside, and my analysis showed a more complex relationship between 'them' and 'us'.

Another consequence of the fact that the "how" is answered at the beginning of the analysis is that the actors disappear in the analysis, and focus is placed on the structures of the buzz and the pipelines. My analysis showed that a focus on actors, and how they are constructed, is crucial to understand the development of discourses and practices which guide behaviour, and thus also the emergence of a "mutual understanding of new knowledge and technologies" etc., which (Bathelt, Malmberg, & Maskell 2004, p.38) discusses. But this is actually left out of the investigation if the buzz and pipelines concept is used.

So my argument here is that the assumption found in the buzz and pipelines theory about the difference between internal relations in clusters and relations that cross cluster boundaries is too simple. I will use this difference as the starting point when I now turn my attention towards another important discussion in the conventional literature on cluster which I would like to discuss critically using the analysis and results above, the discussion about lock-in.

9.3.2 Clusters and lock-in

One concept which is widespread in the cluster literature is the notion of lock-in. The argument basically is, that within cluster certain specific ways of doing things may emerge, shared habits might emerge, special cultures may emerge, special institutions might emerge, or special cognitive frameworks etc., just to mention some of the concepts used, refer also to the discussion about buzz above.

The presence of shared cultures, norms, institutions, habits, etc., is normally seen as something positive in the cluster literature since it can enhance learning in organizations in clusters, see for example the discussion of localized learning in (Malmberg & Maskell 2002; Malmberg & Maskell 2006; Maskell 2001; Maskell & Lorenzen 2004). The presence of such can, however, also turn into a problem, because in some cases the presence of such shared cultures means that new ways of doing things are not explored, and the organizations in the cluster thus become locked into certain development paths. The discussion of lock-in, it should be noted, can be traced back to the evolutionary economies, and the discussion of technological trajectories (Dosi 1982) and organizational routines (Nelson & Winter 1982). (Maskell & Malmberg 2007) use the concept of institutions to frame this issue in relation to clusters, and argue:

“The historically evolved institutional repertoire can thus sometimes get whole countries, regions or cities locked into specific, initially successful, ways of doing things that later external events convert into shackles, which inhibit or block further progress (Elbaum and Lazonick, 1986). At this aggregate level competition is not to be relied on to ensure rejuvenation. Some nations, regions or cities instead depopulate or accept, however reluctantly, a continuous decline in investment levels, consumption and standards of living, while others acknowledge that some collective action is required and struggle to develop deliberate policies often aimed at emulating the institutional structure of more successful peers” (Maskell & Malmberg 2007, p.609)

Exactly why some cities or regions, or clusters for that matter, end in a negative lock-in situation is not clear theoretically, as they argue further:

“It must, however, be admitted that we know preciously little about what determines institutional absorptive capacity and why the institutional set-up of nations, regions or cities on the downhill slope sometimes remains unaffected through extended periods of time in spite of seemingly infinite opportunities for external inspiration from more successful peers. In particular, the literature offers limited insight into precisely how to successfully import unfamiliar institutions deemed superior. Very few contributions throughout the social sciences highlight the fundamental question of how obsolete but well-established institutions can be intentionally transformed at the micro-level of individual action.” (Maskell & Malmberg 2007, p.609-610)

The problem is, as (Maskell & Malmberg 2007) also admit, that it is difficult to break out of specific ways of doing things because institutions work behind the back of people, so to say. Institutions give rise to understandings of what is right to do, and therefore it is difficult for people in a lock-in situation to become aware of the fact that they themselves are caught in specific ways of doing things, and that it would be valuable to change their behaviour. This however, does not stop the authors from offering a relative simple solution to the problem of lock-in as being links to the outside, in other words pipelines which can give new views of things:

“... In this way, a set of decisions and actions, partly framed by the cognitive and other constraints of the actors involved, can combine to create an aggregate structure that turns out to be not just economically sustainable but indeed globally successful. But, as shown in previous sections, the success also carries with it the seeds of future destruction as the evolutionary process of selecting temporarily best practices accumulate to isomorphic pressures that gradually reduce existing variety in routines. Lack of variety combined with spatial myopia leads to an insular mind-set that, in turn, enable local actors to ignore signs of needed readjustment. However, the potentially most damaging long-term consequences may be avoided as long as at least some of the collated firms actively invest in building absorptive capacities and pipelines to external knowledge pools with dissimilar routines or institutional patterns. Pending lock-ins are replaced by rejuvenation processes through the activities of externally

connected and absorptive local firms that ensure variety and create fresh impulses for horizontal learning.” (Maskell & Malmberg 2007, p. 613)

Here we see the assumption that there is a distinction between organizations inside a cluster and the organizations outside. In this conceptualization, the cluster becomes an island, characterized by one way of doing things, in a globalized world, which exists outside the cluster, in which there are other views of how things should be done. Therefore by reaching out to other organizations outside the cluster, through pipelines, it is argued, that lock-in can be avoided. But the analysis in this thesis can be seen as a critical case which shows that this is not always the case.

As argued in relation to the buzz and pipeline discussion above, the analysis in the thesis clearly showed a complex relationship between the organizations within the NorCOM cluster, other local organizations in Northern Jutland, for example the IT Forum and parts of the university, and the MNCs outside the cluster. We saw how, at the same time, the MNCs constituted an ‘us’ and a ‘them’. Importantly, the analysis also showed how discourses and practices emerging in different places came together in a way, so that the people in the NorCOM cluster was constructed in a way so that they had a specific approach to their work, and maintained this over time. In other words, they were in a lock-in situation where they kept their focus on technology and quality etc. And this happened despite the fact that there were plenty of pipelines in the cluster, defined as relationships to customers and suppliers outside the cluster, as well as the fact that most people in the NorCOM cluster were part of MNC organizations which meant that they on a daily basis were confronted with different views of how things should be done, as the story of TIDK illuminated in detail.

What makes the NorCOM case a critical case in this regard is, that (Maskell & Malmberg 2007) argue that pipelines can secure that a cluster does not end in a lock-in situation. Therefore, given the fact that the NorCOM cluster was mainly MNC subsidiaries, and had a large number of pipelines to the MNC organizations, as well as customers and suppliers almost all of which were located outside the cluster, it must be concluded that as the NorCOM cluster ended in a lock-in situation, as it did, then pipelines cannot in themselves be a solution to the lock-in problem. Something more is necessary.

The analysis above showed that it is too simple to argue that relationships to organizations outside the cluster is the remedy against lock-in, because in the NorCOM case, there were plenty of relationships to other organizations outside the cluster with other approaches to the work, these differences was in fact what people in TIDK was struggling with every single day, and despite this exposure to other ways of doing things outside the cluster, people in the NorCOM cluster still developed a lock-in situation. And, importantly, the analysis above shows a complex relationship between the practices and discourses inside the cluster and the ones in the MNCs where the exposure to the outside in certain aspects helped cement the practices and discourses within the cluster. In the NorCOM case, plenty of pipelines were certainly not a remedy which made the organizations in the cluster overcome a lock-in situation. This is an important conclusion, because this again can be traced back to the notion of boundaries of clusters.

It seems that what is asked for by (Maskell & Malmberg 2007) is a universal answer to how a lock-in situation within a cluster can be avoided. This very question suggests that lock-in is something which occurs inside a cluster, which has a boundary to the surrounding world which is characterized by other cultures, and ways of doing things, etc. My analysis above indicates that lock-in is something, in the form of people in a cluster being constructed as specific subjects with a specific approach to their work, which can emerge in the interstice between the cluster and the surrounding world. Lock-in can in other words emerge in the interstice between the practices

and discourses within and the discourses and practices outside. Therefore it is not necessarily a solution to lock-in to create more external relations, more pipelines, as suggested in the existing cluster literature. The solution seems instead to lie in the way in which discourses and practices from within and from the outside meet each other, and thus in the discourses emerging across cluster boundaries.

In the discussions about Foucault's works in chapter 3, it was argued, that we must abandon the notion of evolution, since this concept implies that it is possible to group dispersed events into a unity with a specific force of life, i.e. for example a unity which moves in a specific direction. Doing such ignores all the accidents, misunderstandings and power struggles which created the dispersed events. As mentioned above the notion of lock-in builds on the evolutionary ideas within economics, and the evolution concept which seeps through the discussions around lock-in, has the consequence that it is assumed, that all the dynamics within a cluster can be seen as somehow united into a unity moving in a certain direction, following a particular trajectory. And this trajectory can go in a direction which is good, i.e. a direction which leads to growth of the cluster or a direction which is bad i.e. leads to stagnation and decline of the cluster. In the case of a negative direction, the solution prescribed is relationships to the outside, which can give new competences and ways of doing thing, which in turn can change the direction of the unity within the cluster.

The weakness with this is firstly the assumption in the lock-in theory that a cluster can simply be understood as a unity moving in a certain direction, and secondly, that it is possible to distinguish a right and a wrong direction to move in.

Regarding the first point, the NorCOM case showed that the lock-in which occurred, i.e. the behaviour of focusing on high level technology etc., was the result of a combination of different discourses and practices emerging in different places, at the interstice between the inside of the cluster and the outside. The unity and direction so to say, was the outcome of many discourses and practices emerging in different setting, and importantly they not only emerged inside the cluster, they emerged, as argued earlier in the interstice between the inside and the outside of the cluster. To pinpoint the weakness, the evolutionary concept makes it possible to group a collections of dispersed events into a unity and thus disregard the complex emergence and descent of these events. In the case of a cluster this means, that the lock-in theory assumes that there are a unity within a cluster moving in a certain direction which can be good or bad, and can be changes by inputs from the outside. My study showed that this direction occurred at the interstice between the inside and the outside.

And this point about changing direction leads to the second issue, which is the idea of a right or wrong direction. (Maskell & Malmberg 2007) noted, that some regions "depopulate or accept... a continuous decline" while others "(Maskell & Malmberg 2007, p.609) ... acknowledge that some collective action is required and struggle to develop deliberate policies ..." (Maskell & Malmberg 2007, p.609). So some regions accept decline while other do something to get out of it. The problem is that this polarization implies that there is a correct way and a wrong way, that there are certain competences which are outdated and some that are not. Some that will result in decline others that will result in growth. That people in a declining region should focus on other 'better' competences. The issue is that there is no such thing as truth in relation to what the "right" solution or the right way is. Right or wrong are social constructions, and so are decline and growth. We saw for example in the NorCOM case that the layoff of 1700 workers was seen as something unavoidable in a success story by people in the NorCOM cluster, while people in the municipalities and the region at the same time saw it as an extreme decline and a catastrophe. The TIDK case showed that truth was something which was constructed; it was for example a social construction what the best technological solution to a problem was. Likewise, the analysis of the

NorCOM cluster showed, that it was also a construction what the right thing to do in the cluster was, and the way in which it was constructed was that the right thing to do was to gather resources for 3G development. I will therefore argue, that the argument made by (Maskell & Malmberg 2007) is too simple, because they imply that a region in decline should look at other more successful regions and make relations to the outside to be more like them. In other words, my study showed, that in a cluster in decline, the people did exactly what they thought was the right thing to do to get out of the decline. Furthermore, the solution which (Maskell & Malmberg 2007) offer in the form of pipelines are also dubious, since my case showed that even in a cluster with a large number of external relations, people in the cluster were still constructed in a way so that they did things in a very specific way. A way that had been constructed as the right way.

A central issue in relation to the discussion about lock-in, and in relation to the analysis above, is the issue of diversity versus specialization in clusters. Let me therefore turn focus to this issue now.

9.3.3 Diversity versus specialization in clusters

A long standing debate in relation to clusters and regional development in general, has been about whether specialization or diversification has been the driver of growth. The argument has mainly been around the so-called MAR externalities or the Jacobian externalities (Boschma & Iammarino 2009). One of the newer concepts which is currently gaining a foothold in the literature is the concept of related variety by (Asheim, Boschma, & Cooke 2007; Boschma 2004; Boschma & van der Knaap 1999; Boschma & Iammarino 2009). The argument here is that on the one hand the variety argument has been interpreted too broadly, and on the other the specialisation argument has overlooked the importance of external relations.

Variation, the argument is, is only an advantage if some complementarities exist between the different sectors present in a region. If they are too different, no knowledge can be diffused, and no benefits can thus be gained. (Boschma & Iammarino 2009) therefore define related variety as:

“We define *related variety* as sectors that are related in terms of shared or complementary competences.” (Boschma & Iammarino 2009, p. 293 Original Italics)

In a footnote to this definition they elaborate:

“Related variety is thus not defined in terms of sectors having input-output linkages. It is relevant to make this distinction between the cognitive and the economic dimensions because business networks are not necessarily the same as knowledge networks (see, e.g., Giuliani 2005)” (Boschma & Iammarino 2009, p. 293 Original Italics)

In relation to specialization, the argument by (Boschma & Iammarino 2009) is, that the literature on agglomeration economies has overlooked the importance of external relations, which as some newer contributions argues is important to avoid lock-in. The argument that (Boschma & Iammarino 2009) add, is that external relations in themselves are not enough to avoid lock-in, there need to be the needed absorptive capacity in the region. And (Boschma & Iammarino 2009) use (Cohen & Levinthal 1990)s’ definition of this.

This view on the issue of related variety, which is currently found at the centre of the discussion of the specialization versus diversity debate, is also interesting to see in relation to the analysis in this thesis. Because, this thesis illuminates one fundamental weakness with the argument, and this weakness relates to the economic modelling approach which underpins the concept. The issue is, firstly, that “related” is apparently understood only technologically. As mentioned, the

impact from external relation is framed using the concept of absorptive capacity, which I from a community of practice approach criticized earlier because what it does is to conceptualize humans as some kind of information sponges. To reiterate, if they possess some knowledge of a given type, then they can absorb more of this type of knowledge. The same problem comes with the related variety argument, which is that if there is some relatedness among industries in a region, then knowledge can be spread among them, innovation can be sparked, and regional growth occurs. The big question is, will it occur just because different industries are related?

To reframe this using a metaphor, we may think of two people communicating with each other. One issue is whether they are capable of understanding what each other says, i.e. whether they have related technological (and linguistic) competences. Another issue is whether they are interested in talking to each other. If they are not interested in talking to each other, then it is no help that they are capable of understanding each other.

My analysis did not investigate specifically whether or not knowledge was diffused between the IT environment in Northern Jutland and the telecommunication environment, which given the convergence occurring between the two technologically as described by (Steinbock 2005), must be seen as related industries. But what my analysis showed was that there was a boundary between the IT Forum and NorCOM, before the merger of the two, which meant that certain niche markets were not pursued. This indicates that technological related variety among two industries in a cluster is not necessarily enough to spark growth of new business areas in the interstice between the industries. The industries in question also need to be understood as being related among the people involved. In other words, related variety has to be accompanied by something more, which is a conception in the industries at hand that they are related, and that cooperation etc. is thus desirable. And such conception is a social construction. And if one uses the theory about related variety then one overlooks this important issue. If we for example look at the literature using the theory, then we see that the approach is simply to use for example industry codes to evaluate which industries that are related. This overlooks completely what my study revealed to be important: the issue of whether the industries present in a cluster, or a region, are constructed in a way so that they see each other as related.

The weakness with the related variety theory is, to summarize, that it makes researchers focus only on whether the industries present in a region are related or not seen from a technological level. This means that they do not investigate the discourses and practices through which the industries are constructed as 'related' or 'unrelated' in the minds of the people in the industries. And if the people in the industries see each other as unrelated, then they will not pursue new business together.

Having shortly discussed the analysis of results in this thesis in relation to some of the current discussions within the cluster literature, to show the contribution of this thesis, I will like to end the analysis in this thesis by returning to the starting point, the community of practice theory, and thus come full circle.

9.3.4 Communities of practice and clusters

In section 3.4 I argued, that the Foucauldian approach that I have developed capture certain things that the COP theory does not capture. Let me therefore structure this discussion so that I firstly sketch what my approach captured that a Wengerian would not have captured, and then link the discussion to the ones above, by discussing how my approach illuminates certain issues which are overlooked by the conventional approaches.

My focus using the Foucauldian approach to the question of how people in TIDK was constructed was more far reaching in focus than a Wengerian analysis would have been. A Wengerian analysis would, as the study in (Wenger 1998) illustrates, have focused on a number of certain communities of practice, in my case one COP, or a few, within TIDK, and would have demanded an investigation of how the members of such formed an identity through a nexus of multiple memberships of different communities, as well as the dynamics within these COPs, i.e. the joint enterprise, mutual engagement and shared repertoire. My analysis had a different focus, as the analysis above shows. I focused on changes in practices and discourses within TIDK, but on a larger level, investigating the changes within the organization over time, and further still, I also analysed the construction of the NorCOM cluster in which TIDK was located. This was done through analyses of the discourses and practices surrounding the NorCOM association as well as other key organizations in the story, for example the environment at NOVI, DC Development and Dancall, as well as other organizations, for example Digianswer.

The case thus illustrates well the point that I also made in the discussion in section 3.4, which was, that (Wenger 1998) argues, that people in COPs negotiate meaning on the basis of impacts from outside the COPs, and as such have a power, but this overlooks the un-negotiated basis for this negotiation. In other words, the TIDK case showed, that people in TIDK did indeed think about how they were as subjects in relation to their work, that they were different from TI Nice and TI Dallas employees etc. But the analysis also showed that their understanding of what it meant to be a good worker was constructed through some larger discourses and practices in the cluster which they had little impact on. These were underlying in the discussions and reflections TIDK employees had about their own behaviour. The point is, that just as Robinson Crusoe acted as a trueborn Briton, so did people in TIDK act as true born NorCOM workers, so to say, and this basis, what one did as a true born NorCOM worker, was the horizon by which they judged their actions in relation to their experiences with people from TI Nice etc. There was a basis, an understanding of what a good approach to the work was, develop technology of a high quality etc., but my analysis shows that this basis was developed through the discourses and practices I analysed which was located not only in the communities of practice within TIDK, not only in TIDK, or within TI, but in and around a number of organizations and events, in an around the NorCOM cluster in Northern Jutland, through a period of time spanning from the late 1980s and until that summer day in May, 2007, where I witnessed the meeting in TIDK, and started wondering how the people I watched had become what they were. So to put it shortly, my Foucauldian approach focuses on another analytical level, which encompasses a broader focus than a Wengerian analysis would do. And what is gained from this? By doing this, my analysis is capable of capturing certain important issues which the current theory on COP is struggling with.

I discussed earlier that it is unclear whether the contribution of (Brown & Duguid 2000a) should be located in the economic approach to clusters or in the historian approach. Looking at the arguments in (Brown & Duguid 2000a), and bearing the results of my analysis above in mind, it seems right to place it relatively close to the economic approach. Because it emerges that Brown and Duguid, despite their micro focus on learning dynamics, present a theory which has weaknesses similar to the weaknesses I argued are found in the theory about related variety. The issue is, that although Brown and Duguid are on to something in as much as they present a theory on knowledge diffusion in cluster where they build, not on loosely defined and fuzzy concepts which are difficult to operationalized for empirical work, but instead on the COP theory which it is indeed possible to operationalized, they still lack some important dynamics. And to explain this, let me again pose the question: Even if two COPs has the ability to understand each other due to shared practice, why should they then talk to each other? What if one COP firmly believes that the other has a disgraceful approach to their work, what if they do not like them, what if they feel that they want to steal their work? If we accept that organizations are indeed constellations of communities of practice, and COPs thus exist in some larger structures, and

that the organizational structures of which they are part are indeed also part of a larger structure, then we need a focus on how these structures influence both what goes on inside of the COPs as well as how they influence the dynamics between COPs.

And this is exactly where my contribution lies. I argued earlier, that (Wenger & Snyder 2000) draw a distinction between COPs and management. It is management's role to support COPs in their perspective. It is a similar view we find, although more implicitly, in the works of Brown and Duguid, who in their different contributions spend much effort on discussing how companies, i.e. management, should value COPs. It thus becomes the assignment of management, whatever this is, to make sure that if two COPs can understand each other's practice given some shared practice, then they also talk to each other. And with this line of thinking, although relatively implicit in the COP literature, then a distinction between COP and management emerges. COPs are the dynamic, growing communities in which knowledge is developed, and management becomes the rational actors making sure that the COPs are steered. I argued earlier that it is fruitful to overcome this distinction, and this is exactly what I have done in my analysis. My analysis showed, with departure in the analysis of the events, discourses and practices emerging in and around TIDK and the NorCOM cluster how certain discourses emerged which guided the behaviour of people in TIDK on both a management level and an engineering level. My analysis thus shows that management in TIDK was not something rational compared to the workers. What my approach and analysis does is to overcome the distinction between management and other COPs. With this point, I will end the discussion of my analysis, and turn to the conclusion of this thesis.

Chapter 10: Conclusion

What happens in the interplay between industrial clusters and multinational corporations? This was the questions I had in my mind, when I started this thesis. And so I did what any researcher would have done, I turned to the literature on clusters to investigate how I could analyze this question.

The cluster literature contains a large number of different theories and concepts, but one thing which has characterized this literature in recent years has been a focus upon learning. Dynamics related to learning and knowledge are seen as the key to why clusters exist. I therefore initially chose to illuminate how MNCs influence the dynamics within clusters through the use of a case study of learning within one MNC subsidiary in a cluster building analytically on the community of practice theory presented by Wenger. This theory had already been used in the cluster literature and constituted an approach which made it possible to analyze learning processes within the MNC subsidiary in a way which made it possible to illuminate the impacts from both the local cluster and the global MNC organization upon the learning processes. Further it also put the analytical focus on how learning occurred at the micro level and thus provided an approach which bypassed some of the weaknesses haunting the majority of the cluster literature, which I also discussed in chapter two, for example the lack of focus on the personal level.

This study brought me to that day in May 2007, where I was observing a meeting in Texas Instruments Denmark. And during this meeting, where I was sitting in the corner watching the engineers, listening to their discussions, and making notes, I realize that I was looking at a group of engineers, which were part of a multinational organization, but clearly saw themselves as different from the other engineers within this organization. They were also part of the NorCOM cluster, with all this included, for example the stories they told time and time again about Dan-call and the good old days. But how had they become exactly the subjects they were, with their approach to their work? And at that moment I realized, that I had to make a new and much more important research question for this thesis.

The important question was not how these people developed new knowledge in the interstice between the local cluster and the global MNC. It was rather how the people I was seeing had been constructed as the specific subjects they were in relation to their work, which meant that they behaved as they did. And thereby also to analyze what role the local cluster and the global MNC had played in this construction process.

This meeting thus turned out to be the moment of truth in the analytical work, the point where the previous investigations led to a situation where I realized that another and new question was more important, and that another analytical approach was necessary. To answer this new question, I turned to Foucault and his works. Foucault's methods make it possible to analyze the discourses and practices through which people are constructed as subjects.

Wenger also have a focus on identity in his theory, but as argued in chapter 3, Wenger's analytical framework is aimed at uncovering the learning dynamics occurring in communities of practice. This means that discourses and practices coming from outside the communities of practice which influence the dynamics within these are treated as external influences. The focus in Wenger's perspective is only how these external discourses and practices are negotiated within the communities. What I realized was that the interesting aspect in my analysis was exactly these external discourses and practices influencing the engineers in TIDK. It was these external discourses and practices within TIDK, within TI and within the NorCOM cluster which made these

people the subjects they were. And since Wenger's analytical framework did not make it possible to conceptualize and analyze these I turned away from Wenger's theory and towards Foucault's works, because through the use of Foucault's ideas I could develop a framework capable of doing this. I therefore developed an analytical approach on the basis of Foucault's ideas about genealogy and archaeology, which can be used to investigate how people in an organization within a cluster are constructed as subjects in relation to their work, and also how the cluster which they are part of is constructed.

To use the Foucauldian approach fully also meant that I had to abandon the approach to social science found in the existing cluster literature, and instead I turned to the phronetic approach to social science. Phronetic social science is about putting values back into the analysis. Instead of the search for universal theories, focus is placed on specific contextual knowledge. It is about creating knowledge which can be used in specific situations. It becomes, to use Flyvbjerg's ideas, a matter of asking whether or not we are on the right course in society, and if not, what should be done about it. The use of the phronetic approach to science also means that in this thesis validity and objectivity in research as well as generalization of results are understood differently than in the conventional cluster literature.

Validity becomes a matter of making the "better" interpretation and objectivity becomes a matter of describing the "polyphony of voices" in the case. Generalization in the phronetic sense is not a matter of making universal theories, but instead about making advice about what to do in given situations. It is thus more comparable to rules of thumb advice. In relation to my research, where I utilize Foucault, it is necessary to reflect on the notion of what to do in a given situation, and thus on how values should enter the analysis. Whereas some phronetic researchers are relatively clear in making advice about what to do different in given situations, I have chosen, using Foucault's ideas as the basis, to be more cautious, and interpret the phronetic enterprise as an attempt to illuminate what dangers and problems that exist in the current situation. Foucault argued that everything is dangerous; there are no choices which do not hold within any problems or dangers. The objective of my investigation is therefore not to say what was right or wrong with the story of TIDK as it unfolded, or the NorCOM cluster for that matter, and what should have been done different. It is instead to illuminate all the issues which could have been done different, i.e. all the choices made along the way. In the end of this conclusion I will elaborate on this when I turn to how others can use the results from my analysis. By choosing this approach to science the focus of my research thus became the construction of detailed contextual knowledge, and therefore my new research question became the following specific contextual question:

"How were the people within TIDK constructed as subjects, and how was the NorCOM cluster of which they were part constructed?"

To answer this question I used ideas from Foucault's writings on genealogy and archaeology to develop an analytical framework. Archaeology has previously been seen as a dead end in the secondary literature on Foucault, but in accordance with newer readings of his works I argued for the importance of archaeology, and as something new I argued for genealogy to be put before archaeology analytically.

The reason for putting genealogy before archaeology in the analysis is that if focus is placed on genealogy only then the resulting analysis is focused on events, the chronology of such, and the emergence and descent of such. And such an analysis risks becoming a relatively simple analysis of who does what to whom, i.e. of practices. It is therefore necessary to clearly include the discourses surrounding the events in the analysis, or in other words, the discourses of which the practices studied are part, because then the analysis reveals in more details why some events

occurred while others did not and as such the power-knowledge relations in the case. This means that in my approach the first step is the genealogical investigations of the events, and thereafter focus is moved to an archaeological investigation of the discourses and practices surrounding these events. My argument is thus that without the focus on archaeology one does not capture all the discourses and practices through which the subjects or objects under investigation are constructed.

My analyses therefore started out being genealogical in the sense that I investigated the events which had influenced the organization TIDK over time and the people within it as well as the events which had influenced the NorCOM cluster. Thereafter I expanded focus in the analysis and started exploring the discourses and practices surrounding these events. Finally, I conducted an archaeological analysis of the discourses and practices identified in the two analyses to identify the discursive formations through which the people in TIDK had been constructed as subjects and the NorCOM cluster had been constructed as a cluster. And this also explains the two aspects of the research question, i.e. the focus on both the construction of the subjects in TIDK and the construction of the NorCOM cluster, because the analysis of the discursive formations revealed that it is only possible to understand the discourses and practices through which the people in TIDK were constructed as subjects if the discourses and practices surrounding the NorCOM cluster are taken into the analysis also. These complex analyses thus identified and revealed all those discourses and practices which together made the people in TIDK subjects in relation to their work, and which made the NorCOM cluster a specific cluster.

In other words, what the story of TIDK and the story of the NorCOM cluster and the analysis of the two in chapter 9 together constitute is a description of the problematizations through which the people in TIDK became subjects with a specific approach to their work, and the NorCOM cluster became a specific cluster with a specific history. It is the problematizations which make the people in TIDK enter the game of true and false in relation to their work, so to say, which makes them subjects with a specific approach to their work, which was right or wrong, given the discourses and practices within the NorCOM cluster. It was also the discourses and practices which made the NorCOM cluster an object, a specific cluster in time and space, with a specific history. The discursive formations identified in chapter 9, on the basis of these two stories, can therefore be seen as parts of the problematizations, as pieces in the puzzle, agglomerations in the large and complex network of discourses and practices which constituted the problematizations, which deals with specific issues. And with the discussion of these discursive formations, I have present a analysis of what happened, how the people in TIDK became the subjects they were, and how the NorCOM cluster became the cluster it was.

The contribution of this analysis is two things. Firstly, it identifies how the subjects within TIDK were constructed and how the NorCOM cluster was constructed, and thereby answers the research question. Secondly, the value of this analysis also lies in the way in which it can be used by on the one side the people involved in the story, and on the other side, people in similar situations as well as people interested in clusters.

10.1 The results of the analysis

Given the nature of a Foucauldian and phronetic analysis which calls for a meticulous description of all the discourses and practices in the case, it is often a challenge to summarize the result of phronetic research in a short and precise conclusion, and this is also a challenge I am facing now. The analysis I have created in this thesis can only be understood and interpreted in its elaborate form with all its aspects and details, so what I will do here is only to present some of the essential aspects of the analysis.

The analysis revealed that over time TIDK experienced a number of changes. There were the changes in the technology, the changes in the market, as well as in the management practices and the organizational structure. There were also changes in the work practices of the engineers. In the early years of TIDK the engineers felt that they had a relatively high level of freedom to approach the work in their own way and pursue their own ideas whereas in the latter years the planning and the resource control were tighter, meaning that there were less freedom to pursue ideas. It emerges that these changes also had to do with changes in the technology, which became more integrated and more complex due to the rising number of radios in the phones, as well as the fact that the GSM technology matured. The market also changed which led to a focus on other issues than technological quality, for example time-to-market and cost issues, which in turn meant that less funding was available for R&D. The analysis also investigated the consequences of these changes in relation to the experiences of the managers and the engineers. To an extent the engineers lost their personal relation to their work, and started looking back at the old days in ATL Research with a sense of nostalgia. The analysis of TIDK showed that people in TIDK faced a reality within TI where they were part of political games which were about tasks and competences, about creating truth in the organization and about convincing others about one's value for TI. As the technology and the market, and the TI organization change, their world thus became more complex, they had to participate in the political games, and in the face of this changing world they stuck to what they knew and what they saw as the right thing to do as workers, which was to focus on technological quality and helping each other. This approach to the work was different compared to people in other TI sites, and the analysis explored the characteristics of these differences in detail. We also saw through this analysis, that the people in TIDK felt that these games and the networking activities etc. which were demanded were a distraction from their 'real work'. Real work was in the minds of people in TIDK to develop technology of a high technological level, this they saw as the core of their work, not political games and positioning issues. This focus meant that seen by people outside TIDK in other TI sites, people in TIDK lacked leadership, they were not capable of making an impression upon management in TI, they were putting all their cards on the table, were seen as naïve, they were helping each other, they were consensus oriented, they volunteered too easily, and they were not paying enough attention to political games. This understanding of what 'real work' was among the people in TIDK, and how they ought to act in relation to their work, was a result of the discourses and practices within the NorCOM cluster. From the discourses and practices within the NorCOM cluster the people within TIDK formed their self-understanding of what it meant to be a worker in a telecommunications company, and how they ought to behave as such. Therefore, to understand how the people within TIDK became the subjects they were in relation to their work, it is necessary to focus on the discourses and practices through which the NorCOM cluster was constructed.

Looking at how the NorCOM cluster was constructed; the analysis showed that the first companies in the region made the move into the wireless industry due to technological considerations and considerations about new expansion opportunities. The first unity in the industry emerged in the early 1990s in the environment around DC Development, where an 'us' emerged in the self-understanding among the people who were joined in a struggle against the MNCs outside the region to bring the GSM phone to the masses. The events around DC Development gave rise to a practice of helping each other in the industry in the region because the only way in which the small players Dancall and Cetelco could compete against the large players in the industry was by helping each other and being open and honest. Also in the late 1980s and early 1990s the business researchers at AAU began to focus on the wireless industry in the region, and the analysis showed how the cluster concept made its way from this research environment into the industry, and the dynamics and rationales which led to the emergence of the NorCOM cluster in the mid 1990s, and importantly the key role played by one researcher in this regard. Throughout the last part of the 1990s the cluster was discursively constructed into a success story of fairy-

tale proportions in the discourses in the region. The success stories, which to an extent were started both due to what may be called a success of some of the companies in relation to their work, but also out of promotional work where people in the NorCOM association explicitly tried to articulate the NorCOM cluster as a success story, meant that discourses emerged which argued that the cluster was a success and that people in the cluster were special, which in turn meant people in the cluster started believing this, which meant that weaknesses were overlooked. At the same time a large number of MNC entered the cluster so that the cluster became characterized by consisting mainly of MNC subsidiaries.

Towards the end of the 1990s managers in these subsidiaries started to feel that they needed influence in the MNC organizations, and in the NorCOM forum they agreed that they way to gain this was through understanding where the market was moving. This thus also shows how business became understood in a specific way in the cluster. Business became a matter of choosing the right technological focus, and the jump to 3G became the goal in the cluster. There would be endless discussions about the next killer application in the NorCOM association, and similarly, we saw in the analysis of the people in TIDK that they had discussed different future technologies. Focus was in other words placed on technology. Technology was constructed into the core of the cluster, and the analysis showed how DC development came to play a key role in this discourse. Importantly, the analysis also showed how the discourses and practices around Dancall meant that the issue of a lack of business talent in the region, an issue which was articulated by business researchers already in the late 1980s and evident in many newspaper articles about phones missing the market, was transformed into a discourse about low-skilled production workplaces in a high-wage peripheral region in Denmark. Thereby the success stories about the cluster remained unchallenged by the obvious lack of business and marketing capabilities in the cluster. As the GSM technology matured around the beginning of the 2000s, the analysis showed that a new discussion emerged about where to go afterwards. Given the focus on technology, the goal became to make a jump to 3G similar to the jump to 2G which DC Development made possible approximately 10 years earlier. The discourses around DC Development and Dancall were thus also interpreted in a specific way: technologically, it could have been a success, i.e. Dancall could have become Nokia. Dancall never became Nokia, but this was because of external issues, in the form of a lack of venture capital in Denmark according to the discourses. Here we also see another important issue, which was that success stories were articulated as something internal in the Cluster while weaknesses were articulated as something external.

The 2000s also became a phase where the struggle between the NorCOM organization and parts of the university, the municipality and county as well as other organizations such as IT Forum emerged. Just as the people in TIDK had experienced competition in the political games within TI following the initial success of TIDK after the acquisition, so did the people in the NorCOM association experience competition from other industries and organizations following the immense success in the discourses created around the cluster in the late 1990s. Some parts of the university tried to promote other areas, such as the software environment, which the immense success of the NorCOM cluster in the discourses overshadowed. The municipality and county tried to support other industries after the closure of Dancall, which they saw as a regional catastrophe due to the number of jobs lost. And the IT industry in IT forum tried to gain resources for themselves as well. Together the success stories and these struggles drew the boundaries of the NorCOM association and meant that people in the cluster, and thus also within TIDK, became isolated and stuck to their own ways of doing things, because, in their self-understanding, they were the best. Therefore they saw no rationale in changing their approach to the work, and this explained why the focus on technological quality and on helping each other etc. stayed with the people in the cluster from the beginning of the 1990s and all the way to the end. They saw no point in pursuing niche business areas either, because mobile phones were what their work was about. That was what they were the best at. And this also meant that they maintained their focus

on technology and quality above organizational politics, which were seen as a distraction from their work throughout the history. And this in turn, as the analysis of TIDK revealed, meant that the people in TIDK lost their *raison d'être* within TI, because they were not playing the political game within the organization in a way which gave them enough victories. The analysis also shows that this approach to the work was not something, which was specific to TIDK; it was something which characterized the cluster as a whole. In short, people in the NorCOM cluster were constructed as the subjects they were, through a number of discourses and practices within the cluster, as the analysis above has showed. And who these persons were as subjects are reflected in the way they behaved in relation to their work, and in relation to the challenges they faced as workers.

This also meant that two new 'us's emerged in the story. There was still the 'us' among the employees in the companies in the cluster, who had a special approach to the work, i.e. the focus on technological quality and on helping each other, which had been constructed as the right approach to the work in the early 1990s in the cluster. In relation to the work these people saw people within the MNC organizations in other MNC sites as a 'them', because they had another approach to the work. At the same time there was also an 'us' consisting of the people in the MNC subsidiaries and the few locally owned companies which was joined in a struggle against parts of the university, the municipality, the county and IT Forum for funding and resources which could be used to attract engineers, which there was a shortage of in the middle of the 2000s, as well as to make the jump to 3G which could secure the future. In respect to this struggle the MNC organizations became part of an 'us'. The MNCs thus became at the same time both an 'us' and a 'them'. The 'us' which had emerged as a collection of local companies united in a struggle against MNCs outside the region in the early 1990s thus became a different 'us' in the 2000s consisting of MNC subsidiaries and a few local companies united in a struggle against organizations within the region. Finally, the analysis also showed the end of the NorCOM cluster, as it had been constructed over time. The argument is not that the wireless industry disappeared in the region, it is instead that the NorCOM cluster, which had been constructed as a specific cluster through discourses and practices since the late 1980s ceased to exist. There is still a wireless industry in the region today, but NorCOM as it was is no more, and it must be up to future research to investigate what came after.

10.2 The value of the analysis

Having now presented the result of the analysis, and thus also the answer to the research question, it is time to focus on the value of this analysis and the results. The value of this analysis arises because it illuminates in detail that the history which unfolded was indeed a fragile history, to use Foucault's term, by illuminating the choices that were made along the way.

I am not arguing that people in the cluster did anything wrong in the story, instead I simply argue that the story shows that a number of decisions were made, consciously or unconsciously, and a number of random events, misunderstandings, and external events occurred, and all these came together in creating the result we saw in TIDK and the end of the story, i.e. the employees who felt they had lost their ground etc., and well as the NorCOM cluster we saw at the end of the story, i.e. what was called a coffee club for old friends. It follows from the use of the phronetic and Foucauldian approaches that there is no such thing as a truth. There is no final answer to how the people in TIDK were constructed and how the NorCOM cluster was constructed, but hopefully, this thesis with the analysis it presents, can be used in the future discussions around the NorCOM cluster that was, and its legacy in the region, as well as the TIDK that once was. And this is also where I believe that the value of the analysis lies, because it illuminates some problematizations which I think it is important to think about in the future, for people who were part of the cluster and for people interested in the dynamics which can occur within clusters.

Let me make this clear, I am not here arguing, that the history was good or bad, that the story of TIDK was a success or a failure, or that if this or that was done different, then the end of the history would have been different or better. I only argue that the analysis identified some problematizations, which are interesting because they illuminate some issues which have had a significant influence on the story. And one may, looking at this story, ask whether things could have been better if other choices had been made. Or, to use Foucault's way of looking at thing, what was dangerous in this story? The analysis highlights thus, in other words, that the story which unfolded was not determined from the beginning; it was the result of a number of decisions, accidents and struggles along the way.

Depending upon the perspective one places on the story different aspects becomes relevant and interesting, this follows from the approach of dialoging with a polyphony of voices and illuminating the discourses and practices in detail in the analysis. And this is also the strength of the analysis, because it constitutes a detailed account of the different voices in the case, people coming from different contexts may look at the story and reflect on what they can learn from it, given their own specific situation.

A contribution of this analysis is also that I have developed an analytical approach which overcomes the distinctions made in the conventional cluster literature between the dynamics within and the dynamics outside a cluster. The approach used in the analysis makes it possible to analyze how subjects within organizations in clusters are constructed through a number of discourses and practices emerging in different spheres, in a way which abolishes the distinction between dynamics within a cluster and outside a cluster. It thus shows how the cluster and its organizations and people are constructed in the interstice between the local cluster and the global world outside.

The analysis in this thesis can hopefully be used by the people who were part of the story to reflect on their history, and the choices they made, and the dangers inherent in these, as well as by people in other clusters. People in other clusters should not expect to get clear advice about what to do and what not to do from this analysis. The goal is not to develop universal theories. The contribution of this thesis is to present the construction processes as elaborately as possible and thereby illuminate all the choices that were made along the way and the results of these, and on the basis of this the reader can himself draw his conclusions. So here I will leave the story to you, and hope you can put it in relation to the context which you are part of, and hopefully this new context will add new perspectives on the story, the choices that were made and the outcomes.

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